

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.

**1.2 SUMMARY**

- A. This section includes hydraulic passenger elevators.
  - 1. Engineering, equipment, labor and permits required to satisfactorily complete elevator installation as required by contract documents.
  - 2. Hydraulic elevator system: hydraulic elevators with double and single entrances.
  - 3. Motor and pump, controllers, hoistway, equipment, and accessories.
  - 4. Maintenance service as described herein.
- B. Related Sections: The following sections contain requirements that relate to this section:
  - 1. Field painting of hoistway entrances is specified in Division 9, Section 09900 - PAINTING.
  - 2. Ventilation of hoistway(s) and machine room(s) is specified in Division 15.
  - 3. Vibration isolation is specified in Division 15, Section 15241 - VIBRATION CONTROL.
  - 4. Electrical service to each elevator, including fused disconnect switch, is specified in Division 16 sections.

**1.3 DEFINITIONS**

- A. Hydraulic elevators are hereby defined to include systems in which cars are hoisted either directly or indirectly by action of a hydraulic plunger and cylinder (jack); with other components of the work including fluid storage tank, pump, piping, valves, car enclosures, hoistway entrances, control systems, signal equipment, guide rails, electrical wiring, roping, buffers, and devices for operating, dispatching, safety, security, leveling, alarm, maintenance, and similar required performances and capabilities.

**1.4 REFERENCES:**

- A. ADA - Americans with Disabilities Act.
- B. AISC - Design, Fabrication and Erection of Structural Steel for Buildings.

- C. ANSI A117.1 - Buildings and Facilities - Providing Accessibility and Usability for Physically Handicapped People.
- D. ANSI/ASME A17.1 - Safety Code for Elevators and Escalators 1996 Edition.
- E. ANSI/ASME A17.2 - Inspector's Manual For Elevators and Escalators 1996 Edition.
- F. ANSI/ASME A17.5 - Elevator and Escalator electrical Equipment.
- G. ANSI/AWS D1.1 - Structural Welding Code, Steel.
- H. ANSI/NFPA 70 - National Electrical Code.
- I. ANSI/NFPA 80 - Fire Doors and Windows.
- J. ANSI/UL 10B - Fire Tests of Door Assemblies.
- K. APA - American Plywood Association.
- L. ASTM A 36 - Structural Steel.
- M. ASTM A 53 - Pipe, Steel, Black and Hot Dipped Zinc-Coated, Welded and Seamless.
- N. ASTM A139- Electric-Fusion (ARC)-Welded Steel Pipe (NPS 4-in. and Over).
- O. ASTM A 167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
- P. ASTM A 366 - Steel, Sheet, Carbon, Cold-Rolled, Commercial Quality.
- Q. ASTM A 446 - Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality.
- R. ASTM B 221 - Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.
- S. NEMA LD3 - High Pressure Decorative Laminates.
- T. NEMA MG1 - Motors and Generators.
- U. NFPA 101 Life Safety Code.
- V. Steel Structures Painting Council (SSPC) - Steel Structures Painting Manual.

#### 1.5 DESIGN REQUIREMENTS:

- A. Terms used are defined in the latest edition of the safety code for Elevators and Escalators, ASME A17.1, A17.2, A17.5, NFPA 70, NFPA 101, ADA.
- B. "Code" refers to ASME A17.1, A17.2, A17.5, NFPA 70, NFPA 101, ADA, and applicable Building Code. All work performed shall be strict accordance with the code including all maintenance and testing requirements.
- C. Where a device or part of the equipment is herein referred to in the singular number, such reference shall apply to as many such devices as are required to complete the installation.

## 1.6 PERFORMANCE REQUIREMENTS:

- A. Car Speed:  $\pm 10$  percent of speed under any loading condition.
- B. Car Capacity: safely lower, stop and hold up to 125 percent of rated load.
- C. Car stopping Zone:  $\pm 3/8$ " under any loading condition.
- D. Pressure: fluid system components shall be designed and factory tested for 500 p.s.i. maximum operating pressure shall be 400 p.s.i.

## 1.7 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specifications Sections.
- B. Product Data for each principal component or product of each elevator, including certified test reports on required testing. Indicate capacities, sizes, performance and operating characteristics, features of control system, finishes, and similar information. Indicate any variations from specified requirements.
- C. Shop Drawings:
  - 1. Submit complete Shop Drawings including dimensioned drawings showing plans, elevations, sections and large-scale details indicating service at each landing, excavation requirements for jack, coordination with building structure, and relationships with other construction.
  - 2. Submit complete Shop Drawings of elevator car enclosures, showing details of construction and location of signal and car equipment.
  - 3. Submit complete Shop Drawings of elevator hoistway entrances and doors, showing method of operation, details of construction, and method of fastening to structural members.
  - 4. Submit elevating diagrams to indicate elevator service to each level.
  - 5. Submit wiring diagram detailing wiring for power, signal and control systems, differentiating clearly between manufacturer-installed wiring and field-installed wiring. Indicate maximum and average power demands. Each device on wiring diagram shall be properly identified by name, letter, or standard symbol identical with markings on devices or controller panel.
  - 6. Submit layout of graphics components for coordination by the Architect.
  - 7. Submit certification of compliance with Code and ANSI A17.2 requirements for testing of elevator components.
  - 8. Indicate variations from specified requirements, maximum dynamic and static loads imposed on building structure at points of support, and locations of signals. Include maximum and average power demands.
  - 9. Submission of manufacturer's "generic" non project specific shop drawing, not showing actual project hoistway will be considered nonresponsive and returned.

- E. Samples of exposed finishes of car enclosures, hoistway entrances, and signal equipment, 12" x 12" samples of sheet materials and 12" lengths of running trim members.
- F. Maintenance Manuals: 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.
- 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.

## 1.8 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Fabrication of hydraulic elevators shall be performed only by a qualified fabricator. The term qualified means experienced in performing the Work required by this section. The qualified fabricator shall have experience on Projects similar in size and scope to this Project. The fabricator shall submit evidence of such qualifications upon request.
- B. Installer Qualifications: Installation of hydraulic elevators shall be performed only by a qualified Installer. The term qualified means experienced in performing the Work required by this section. The qualified installer shall have experience on Projects similar in size and scope to this Project. The installer shall submit evidence of such qualifications upon request.
- C. Document Verification: in order to discover and resolve conflicts or lack of definition which might create problems, review contract documents for compatibility with proposed product prior to bidding. Review structural, architectural, electrical and mechanical documents, and elevator specification.
- D. Source Limitations: unless otherwise indicated, obtain elevator system through one source from a single manufacturer.
- E. Regulatory Requirements: In addition to local governing regulations, comply with applicable requirements of ASME/ANSI A17.1, Safety Code for Elevators and Escalators (hereafter referred to as the "Code").

## 1.9 WARRANTY

- A. General Warranty: The elevator warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.
- B. Special Project Warranty: Provide special project warranty, signed by Contractor, installer, and manufacturer, agreeing to replace, repair, or restore defective materials and workmanship of elevator work during warranty period. This warranty shall be in addition to, and not a limitation of, other rights the Owner may have against the Contractor under the Contract Documents.
  1. "Defective" is hereby defined to include, but not by way of limitation, operation or control system failures, performances below required

minimums, excessive wear, unusual deterioration or aging of materials or finishes, unsafe conditions, the need for excessive maintenance, abnormal noise or vibration, and similar unusual, unexpected, and unsatisfactory conditions.

2. Warranty period is twelve (12) months starting on date of Substantial Completion.

- C. Warranties: Provide coincidental product warranties where available for major components of elevator work. Submit with maintenance manuals.

## 1.10 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Provide full maintenance service by skilled, competent employees of the elevator installer for period of 12 months following Date of Substantial Completion. Include monthly preventive maintenance performed during normal working hours. Include repair or replacement of worn or defective parts or components and lubricating, cleaning, and adjusting as required for proper elevator operation in conformance with specified requirements. Include 24-hours-per-day, 7-days-per-week emergency callback service with a response time of 2 hours or less. Exclude only repair or replacement due to misuse, abuse, accidents, or neglect caused by persons other than installer's personnel.
- B. Continuing Maintenance Service: Installer shall provide a continuing maintenance proposal to Owner, in the form of a standard yearly (or other period) maintenance agreement, starting on date construction contract maintenance requirements are concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturer: Subject to compliance with requirements, provide products of one of the following:
  1. Thyssen Krupp Elevator Corp., Horn Lake, MS.
  2. KONE, Moline IL 61265,
  3. Otis Elevator Co., Chicago, IL 60607,
  4. Schindler Elevator Corp., Morristown, NJ 07962.

### 2.2 MATERIALS AND COMPONENTS

- A. General Requirement: Provide manufacturer's standard pre-engineered elevator systems that will comply with or fulfill the requirements of elevator schedule sheet at end of this section or, at manufacturer's option, provide custom-manufactured elevator systems that will fulfill requirements. Where components are not otherwise indicated, provide standard components published by manufacturer as included in standard pre-engineered elevator systems and as required for a complete system.

- B. Hydraulic Machines and Elevator Equipment: Provide manufacturer's standard two stage hydraulic plunger-cylinder unit for each elevator, with electric pump-tank-control system equipment in machine room as indicated.
- C. Piping: Provide size, type, and weight piping recommended by manufacturer, and provide isolation couplings to prevent sound / vibration transmissions from power unit.
- D. Inserts: Furnish required concrete inserts and similar anchorage devices for the installation of guide rails, machinery, and other components of elevator work where installation of devices is indicated as work of another specification section.
- E. Car Frame and Platform: Manufacturer's standard welded steel units.

### 2.3 CONTROL SYSTEMS

- A. General: Provide manufacturer's standard control system for each elevator or group of elevators as required to provide automatic or group automatic operation of the type indicated and defined in the Code as "Operations."
- B. Single Elevator Control - Passenger: Provide solid-state "Selective Collective Automatic Operation," as defined in ASME/ANSI A17.1.
- C. Auxiliary Operations / Controls: In addition to primary control system features, provide the following controls or operational features for passenger elevators, except where otherwise indicated:
  1. Emergency power operation. Connect elevator controller/pump devices to emergency power circuitry shown in the electrical drawings.
  2. Loaded car by-pass.
  3. Independent service.
  4. Automatic 2-way leveling.
  5. Automatic dispatching of loaded car, in conjunction with load weighing device.
- D. Security Features: In addition to above operational features, provide the following security features for passenger elevators, except where otherwise indicated. Security features shall not affect emergency firefighter's service.
  1. Keyswitch operation feature with car and hall pushbuttons activated and deactivated by security keyswitches. Key is removable only in the deactivated position.
  2. Anticrime feature activated by a keyswitch that causes car to return immediately to a predetermined floor and open door for inspection. On deactivation by keyswitch, car completes calls registered before keyswitch activation and resumes normal operation.
- E. Firefighter's Service: Elevator to be provided with firefighter service and shall conform to Rule 211.3 "Firefighter Service" of ASME A17.1.

### 2.4 SIGNAL EQUIPMENT

- A. General: Provide signal equipment for elevator 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; fabricate of acrylic or other permanent translucent plastic.
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.
3. Car Control Stations: Provide car control station in each car with flush-mounted metal faceplates containing illuminated halo call button for each landing served and other buttons, switches, and controls required for specified car operation and control. Mount as shown or scheduled at height complying with ASME/ANSI A117.1. If not otherwise indicated, 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.
4. Car Position Indicator: For passenger elevator cars, provide either illuminated-signal type or digital-display type, located near top of each car or in car control station. Include direction-of-next-travel signal if not provided in car control station.
  - a. In addition to visual indicator, provide audible signal to indicate to passengers that car is either stopping at or passing each of the floors served.
5. Hall Push-Button Station: Provide hall push-button station at each landing.
  - a. Locate as is most convenient for approaching passengers. Provide unit with flat faceplate designed for flush-mounting on wall with body of unit recessed in wall.
  - b. Provide 2-button station where passengers can travel either direction; 1-button station where only one direction of travel is available and indicate which direction that is.
6. Hall Lanterns: Provide units with illuminated "up" and "down" signal arrows, but provide single arrow where only one direction is possible. Provide units projecting from faceplate for ease of angular viewing, except provide flush units where a location in hoistway entrance frame is indicated. Match materials, finishes, and mounting method of hall push-button stations.
  - a. At manufacturer's option, hall lantern signals may be placed either above or beside each hoistway entrance or in both jambs of entrance frame for each elevator. Mount at minimum of 6 feet - 0 inches above finished floor.
  - b. 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.
7. Hall Position Indicator: Provide illuminated-signal type or digital-display type, located above each hoistway entrance at ground floor. Match materials, finishes, and mounting method of hall push-button stations.
  - a. Integrate ground-floor hall lanterns with hall position indicators.
8. Telephone: Provide manufacturer's standard ADA-compliant, vandal-resistant telephone system contained in flush-mounted cabinet and complete with identification and instructions for use.
9. 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 on each car control station.

10. Car-Top Alarm: Provide switches on top emergency exits that will cause alarm to sound when cover is opened.

## 2.5 ELEVATOR CAR ENCLOSURES

- A. General: Provide car enclosures as 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. Unless indicated otherwise, 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.
  1. Materials and Fabrication: Provide selections as indicated for each car enclosure surface; provide manufacturer's standards, but not less than the following:
    - a. Stainless Steel: AISI Type 302/304 with No. 4 satin finish.
    - b. Aluminum Sills: Extruded aluminum, with grooved surface, 1/4 inch thickness, mill finish.
    - c. Plastic Laminate: High-pressure type complying with NEMA LD3, Type GP-50; color, texture and pattern to match wood panel wall system – vertical applied panels.
    - d. Fabricate car door frame integrally with front wall of car.
    - e. Fabricate car with recesses and cutouts for signal equipment.
    - f. Low voltage downlight ceiling with stainless steel laminate.

## 2.6 PERSONAL PROTECTIVE DEVICES

- A. Handrails: Unless indicated otherwise, provide manufacturer's round tubular stainless steel handrails on side walls and back wall either continuous or segmented units.
- B. Door Edge Protective Device: Provide retractable edge shoe on leading edges of elevator entrance doors that causes doors to stop and reopen upon contacting an obstruction in entrance.
- C. Photo-Eye Detection Device: Provide electronic photo-eye device with timed cutout, projecting dual light beams across car entrance at 5 inch and 29 inch heights, that when interrupted will cause closing doors to stop and reopen. Provide keyed switch in car operating panel or toggle switch in service cabinet for disconnecting photo-eye protective device.
- D. Nudging Feature: After car doors are prevented from closing for a predetermined adjustable time period, through activation of detection device or door edge protective device, a loud buzzer shall sound and doors shall begin to close at reduced rate of speed. Doors shall continue to close unless door edge protective device is activated, which shall cause doors to reopen. Process shall repeat continuously until obstruction is removed from entrance.

## 2.7 PASSENGER HOISTWAY ENTRANCES

- A. General: Unless indicated otherwise, provide manufacturer's standard, pre-engineered, 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 that comply with manufacturer's standards, but not less than the following:
1. **Stainless Steel Frames:** Formed stainless steel sheet, AISI Type 302/304 with No. 4 satin finish.
  2. **Satin Stainless Steel Door Panels:** Flush stainless steel construction, AISI Type 302/304 with manufacturer's standard directional polish or satin finish.
  3. **Aluminum Sills:** Extruded aluminum, with grooved surface, 1/4 inch thickness, mill finish.
  4. **Nonshrink, Nonmetallic Grout:** Factory packaged nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107. Provide grout specifically recommended by manufacturer for grouting door sills and similar applications.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Prior to commencing elevator installation, examine hoistways, hoistway openings, pits, and machine rooms, as constructed; verify all critical dimensions and examine supporting structure and all other conditions under which elevator work is to be installed. Notify Contractor 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 in a manner acceptable to the installer.

### 3.2 INSTALLATION OF ELEVATOR SYSTEM

- A. **General:** Comply with manufacturer's instructions and recommendations for work required during installation.
- B. Install plunger-cylinder units plumb and accurately centered for elevator car position and travel; anchor securely in place.
- C. **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.
- D. **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.
- E. **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 to eliminate sources of structure-borne noise from elevator system.

- F. Install piping without routing underground, where possible. Where not possible, cover underground piping with permanent protective wrapping before backfilling.
- G. Lubricate operating parts of systems, including ropes, if any, as recommended by manufacturers.
- H. Alignment: Coordinate installation of hoistway entrances with installation of elevator guide rails for accurate alignment of entrances with cars. Where possible, delay installation of sills and frames until car is operable in shaft. Reduce clearances to minimum, safe, workable dimension at each landing.
- I. Leveling Tolerance: 1/4 inch, up or down, regardless of load and direction of travel.
- J. Set sills flush with finished floor surface at landings. Coordinate with other trades to facilitate and ensure proper grouting of sills.

### 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.
- B. Operating Tests: Load each 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 pump motor (except submerged pumps) during 30 minute test period. Record failures of elevator to perform as required.
- C. Advise Contractor, Owner, Architect, and inspection department of governing agencies in advance of dates and times tests are to be performed on elevators.

### 3.4 PROTECTION

- A. At time of Substantial Completion of elevator work (or portion thereof), 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.
- B. Provide similar protective measures for elevator units that will be placed in temporary service, including inspection and maintenance service during period of temporary service.

### 3.5 DEMONSTRATION

- 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.

- B. 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.

#### ELEVATOR SCHEDULE - HYDRAULIC PASSENGER ELEVATORS

Capacity:	3,500 pounds center opening.
Speed:	100 / 125 fpm.
Landings Served:	1 and 2.
Power Supplied:	480 volts AC, 3 phase, 60 hertz.
Machinery:	Two-stage plunger-cylinder unit with steel well casing, positive-displacement pump, AC motor.
Control System:	Automatic operation, 1-car group.
Auxiliary Operations:	As specified.
Signal Equipment:	As specified.
Car Enclosure:	6 feet, 8 inches wide by 5 feet, 5 inches deep clear car inside dimensions. 3 feet, 0 inches wide by 7 feet, 0 inches high stainless steel car doors. Two-speed center opening. Stainless steel front walls with integral stainless steel car door frames. Ceiling: Manufacturer's low voltage downlight with satin stainless steel laminate. Side and Rear Walls: Vertical applied panels with decorative trim – Mart wood panel wall system. Operating Panel: Satin stainless steel finish. Floor prepared to receive carpet (refer to Division 9, Section 09680 - CARPET). Handrail: round tubular satin stainless steel
Hoistway Entrances:	3 feet, 6 inches by 7 feet, 0 inches. Satin stainless steel entrance doors and frames, rated and labeled for 30-minute temperature rise of 650 degrees F.
Additional Requirements:	Protective blanket hooks in car, 1 complete set of full-height blankets, dark tan color.

END OF SECTION 14240