

SECTION 14 2442 - LIMITED USE LIMITED APPLICATION ELEVATORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This specification applies to design, fabrication, installation, testing, adjusting and maintenance of hydraulic LU/LA elevator equipment. Elevator shall be provided where shown on the drawings.
- B. Work: The work shall include, but not be limited to the following for Elevators **<Insert Elevator Numbers>**.
 - 1. A hydraulic LU/LA elevator, complete with electrically operated power unit, jack assembly, buffers, guide rails, signal fixtures, control equipment, elevator car, sling, platform, cab interior, handrails, car doors, hoistway doors and all hardware required to provide a complete and fully operational LU/LA elevator.
 - 2. Testing and adjustment of all elevator related controls and equipment.

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- a. Attachment plates, angle brackets, and other preparation of structural steel for fastening guide-rail brackets.

1.6 ACTION SUBMITTALS

- A. General: Contractor shall assemble a complete package within 45 days of Award of Contract.
- B. Product Data: Include capacities, sizes, performances, operations, safety features, finishes, and similar information. Include product data for car enclosures, hoistway entrances, and operation, control, and signal systems.
 - 1. Power Data: Contractor shall provide electrical calculations for all three-phase and single-phase feeder requirements. The electrical calculations shall include full load maximum current, cab lighting current, in-rush current and maximum heat loads.
 - 2. Test Data: Contractor shall provide certified laboratory test reports on components as specified or required by referenced codes.
- C. Shop Drawings:
 - 1. General: Drawing review shall not be interpreted as an indication that submittal is correct or that work represented by submittal complies with the Contract Documents.
 - 2. Machine room plan indicating equipment sizes, location of equipment and location of electrical service connection.
 - 3. Vibration/noise transmissibility characteristics, including both mechanical and electrical, for all power transmission components and the method of elimination/ attenuation of all potential vibration/noise transmission.
 - 4. Section thru the hoistway indicating the size, weight, location and support spacing of the guide rails with support detail and fastening methods.
 - 5. The location and required capacity of the hoisting beam, which is to be furnished and installed by the Contractor.
 - 6. Structural loads imposed by the elevator to the guide rails, support brackets, and building structure.
 - 7. Sizes and location of blockouts, back-

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C. Hoistway Requirements:

1. Enclosure: Fire-rated walls shall be provided. Front wall shall be constructed after entrance frames have been installed. Any holes in the interior hoistway walls shall be patched to maintain fire rating. Sprayed-on fiber insulation shall not be applied to any surface of the hoistway walls to achieve the required fire rating.
2. Alignment: Hoistway shall be provided which is plumb within 1 inch.
3. Projections: Beveled guards (minimum 75 degrees) shall be provided where the side or rear wall projects, recedes or is set-back more than 2 inches.
4. Patching: Walls shall be patched for drywall-type entrance assemblies to maintain fire rating.
5. Painting: Walls around entrances and fixtures shall be painted. Baked enamel entrance frames and door panels shall be painted.
6. Buffing: Stainless steel entrance frames and door panels shall be cleaned, buffed and shined.
7. Sump Well: A sump well shall be provided in the elevator pit area. A metal cover shall be provided over sump well which shall be capable of supporting 300 pounds and shall be installed level with the pit floor. Existing drains shall be removed.
8. Sump Pumps: Sump pump shall be provided in pit. The pump shall be a single-phase 110-Volt submersible type and be complete with a waterproof cord and plug. A gate valve, check valve and union shall be installed in the pump discharge line. Sump discharge line shall not be directly attached to a drain or sewer line or discharge into a sink or grated drain. Sump line shall discharge into a sanitary line, not a storm line. Sump discharge line shall discharge into an open site hub drain outside the pit and hoistway with an air gap of at least 1 1/2 times the diameter of the discharge pipe. The sump discharge line shall not create a tripping hazard in the pit area. It shall be run against a wall so that it will not occupy available refuge space in the pit area.
9. Non-Elevator Equipment: Pipes, ducts or any other non-elevator equipment may not be installed in the hoistway.

D. Electrical Requirements:

1. Mainline Disconnect: One lockable, fused three-phase shunt-trip disconnect switch shall be provided for each elevator by the access door of the machine room located within sight of both controller and machine assembly. This disconnect shall be provided with a sign to identify the location of the supply side overcurrent protection. A separate source from an emergency power circuit shall be provided for the shunt-trip circuit. An auxiliary contact shall be provided to remove power from the shunt-trip relay when the shunt trip disconnect actuates.
2. Cab Lighting Disconnect: One lockable fused single-phase 120 volt service with switch shall be provided for each elevator in the machine room. The source shall be from an emergency power circuit. This disconnect shall be provided with a sign to identify the location of the supply side overcurrent protective device. The overcurrent device protecting the branch circuit shall be located in the elevator machine room.
3. Machine Room Lighting: Adequate lighting (minimum 20 ft-c) shall be provided in the machine room. At least one covered dual 4' light fixture with LED illumination shall be provided for each elevator. One light switch shall be provided on the lock-jamb side of the machine room door.

for each elevator. A second light fixture and three-way switch shall be provided for elevators which have multiple levels or multiple hoistways. A duplex GFI-type outlet shall be provided in each pit area. The lighting and outlet shall be from a separate branch circuit.

5. Sump Pump: Adequate power shall be provided in the pit area for the sump pump. A single non- GFI-type outlet shall be provided in the pit area. The outlet shall be from a separate branch circuit.
6. Electrical Piping: All electrical piping runs shall be run overhead or in a manner which does not restrict the clearance around and the access to both the electrical and elevator equipment.

E. Cab Requirements:

1. Flooring: Flooring shall be provided for each elevator cab.
2. CCTV: Cameras shall be provided for each cab.

F. Communication Requirements:

1. Cab Telephone/Data Service: Piping, wiring, box (jack) and connection to terminals in the elevator controller shall be provided for each elevator for voice and remote monitoring system. Provide one (1) NUIT University Standard Outlet (USO 4-wire jack) for each elevator. Contractor to record phone number before disconnecting existing phone line. Contractor to provide cable test reports to NUIT and coordinate activation of new phone lines and data connections.
2. Piping: All piping runs shall be run overhead in the machine room or in a manner which does not restrict the clearance around and the access to both the electrical and elevator equipment.

G. Life Safety Requirements:

1. Smoke Detectors: Smoke sensors shall be provided as required and dry contacts terminated in the machine room adjacent to the group controller assembly.
2. Heat Detectors: Heat sensors shall be provided within 2 feet of each sprinkler head and connected to the shunt-trip disconnect switch in order to remove power from the elevator equipment prior to water being applied.
3. Interface Devices: Wiring, box with LED indicator and connection to terminals in the elevator controller shall be provided for each elevator group. Input signals shall be

3. Hoistway Sprinklers. Sprinkler head(s) shall be provided in each elevator hoistway.
4. Pit Sprinklers: Sprinkler head(s) shall be provided in each elevator pit.
5. Sprinkler Risers and Returns: All sprinkler risers shall be located outside the hoistway.
6. Branch Lines: Branch lines in the hoistway shall supply sprinklers at not more than one floor level.

1.11 TEMPORARY USE OF ELEVATORS

- A. General: Temporary use of the elevators during installation, if absolutely required, shall be limited and under the direct control of the Owner.
- B. Protection: Contractor shall provide guards or temporary enclosures to protect the surfaces of the car interiors, hoistway entrances and fixtures from damage.
- C. Maintenance Costs During Temporary Use: Cost of maintaining elevator in operating condition during construction is not included in this contract and shall be negotiated between the Contractor and Owner.
- D. Documentation: Owner shall execute the Contractor's "Temporary Use" form before the elevator is placed in temporary service.
- E. Temporary Use Condition: Upon notification by the Owner, the elevators shall be stripped of all protective materials, fully tested and check-out and turned over to Owner in "like-new" condition.

1.12 MAINTENANCE SERVICE

- A. General: Contractor shall provide all maintenance, repair and adjustment to the elevator equipment from the Date of Award through the end of the Warranty Period.
- B. Owners Maintenance Representative: Contractor shall coordinate all maintenance, callback and repairs with the Owner. If there is no answer, a message may be left on the voice mail system. The foreman, or if unavailable, another representative shall sign all maintenance and callback reports.
- C. Service Time Frequency: Contractor shall provide service examinations once a month or approximately every thirty days.
- D. Service Examinations: Contractor shall inspect all mechanical and operational aspects of the elevator equipment. Work shall include the repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper elevator operation at rated speed and capacity. Use parts and supplies as used in the manufacture and installation of original equipment. Should a monthly service visit be missed or a period in excess of 32 days passes without the elevator being serviced, the elevator service time and warranty shall be extended for an additional 32 days. This extended service and warranty period shall be subject to the same requirements, including service visits and warranty and service extension for missed visits.
- E. Elevator Personnel: Contractor shall provide a qualified elevator mechanic directly in the employ of the Contractor to perform all Service Examinations and Callbacks.
- F. Cleaning and Service: The elevator equipment and equipment areas shall be left in a clean condition after each examination. Cleaning shall include car top, pit area, hoistway, and

machine room area. Any oil or lubrication leaks shall be wiped clean and the cause of the leak shall be corrected.

- G. Written Reports: Contractor shall provide signed, dated, detailed reports of the service work performed to the Owner immediately or within a reasonable time after the service work was performed. These reports shall be legible. Poor quality carbon copies will not be acceptable. The mechanic who performed the work and the Owner must sign reports.
- H. Notification: Contractor shall notify the Owner of what specific piece of equipment will be serviced and when it will be performed prior to performing service on the elevator equipment.
- I. Repairs and Notification: Contractor shall notify the Owner should it become necessary to remove the elevator from service for an extended period of time beyond normal industry standard service requirements. This work shall be coordinated with the Owner and appropriate departments.
- J. Call Backs: Contractor shall respond to all callbacks for warranted items 24 hours per day, 7 days a week, including all Holidays, within 2 hours time of being notified of the call, at no additional cost to the Owner during the 12 month warranty period. A written report stating the nature of the call back, any parts that were used and the action taken to correct the problem which resulted in the call shall be provided to the Owner. This report shall be signed by the Owner. This report shall be clear, legible, signed and dated by the mechanic that performed the work.
- K. Reviews: Contractor shall provide personnel for maintenance reviews. Owner may schedule this review anytime during the installation and warranty periods. Contractor shall provide any modifications to the elevator equipment and any adjustment necessary to meet requirements of the Contract Documents identified during the review within 30 days of notification.

1.13 WARRANTY

- A. General: Contractor shall guarantee that the materials and workmanship of the elevator equipment installed under these specifications shall be first-class in every resp

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1. Quantity: **<existing/calculated number of elevators>** LU/LA Elevator.
2. Elevator Number: **<# existing/new number>**.
3. Type: 1:2 Cable Hydraulic.
4. Capacity: **<1,400>** Pounds
- 5.

- c. Machine Room Heat Emissions: The elevator shall not produce more than **<3,200>** BTU's in this area.
9. Car Weight: The suspended load of the elevators shall be maintained within the 5% of the designed suspended load of a fully loaded car, which includes the car structure, car equipment, door equipment and cab assembly

2.2 CONTROL SYSTEMS

A. Operational Control:

1. Group Operation: Provide selective collective group operational control to operate the elevator automatically in response to car and hall calls. The elevator shall stop for hall calls only in the direction of travel. The elevator shall reverse automatically in response to a hall call in the opposite direction of travel. The elevator shall reverse without door cycle after hold open time has expired when there is no further demand in the direction of travel and shall close after the additional hold open time has expired. The elevators shall zone after the last call is answered. There shall be one zone for the elevator.
2. Back-up Group Operation: Provide means to maintain elevator service in the event that the group operational control system cannot assign hall call demands.
3. Redundancy: Provide means to verify safe operation utilizing redundant devices prior to each start of the elevator from a floor during Automatic Operation.
4. Programmed Shut-Down Operation: Provide means to stop the elevator at the next un-secure floor, open the doors and remove the elevator from service. The controller shall prevent the operation of the elevator until the problem is manually reset. This operation shall be activated by an encoder over-speed monitor, reduced incoming power monitor, hoist motor over-temperature monitor, the controller over-temperature monitor.
5. System Diagnostics: Provide means to identify faults within the control system, including those which do not remove an elevator from service.
6. Firefighters' Emergency Operation: Provide means to recall the elevator during an emergency (Phase I only). Provide connections for smoke detector activation of lobby and alternate floor automatic return.
7. Inspection Operation: Provide means to operate the elevator at reduced speed from the top of the elevator. Activation of Inspection Operation shall remove the elevator from service.
- 8.

closed, oil may be bypassed with the pump motor running until the oil is within the proper range. The elevator shall immediately respond to any hall or car calls and shall return this feature when all calls have been answered.

12. Cab Lantern Operation: Provide means to indicate direction of elevator travel in response to a call. Lantern shall light with the door open movement and shall stay lit until doors begin to close. Audible signal shall sound when the lantern is lit and shall sound once for up travel and twice for down travel.
13. Delayed Operation: Provide means to remove an elevator from group operation in the event that it is delayed and cannot respond to demands.
14. Emergency Lighting Test Operation: Provide means to remove power to the normal lighting and illuminate the emergency lighting in the elevator cab from the battery source.

B. Motion Control

1. Automatic Operation: Provide motion control which automatically decelerates, levels and stops the elevator in response to a call.
2. Re-

- f. Initial Timer Settings: Timers shall be initially set to the minimum allowed by handicapped accessibility standards. Car call and door close buttons shall have no effect on timers.
7. Door Stall Operation: Provide means to re-open doors in the event that the doors do not close all the way within 30 seconds of closing operation. Provide means to remove the elevator from service after the third unsuccessful attempt.

2.3 CONTROLLER ASSEMBLIES

- A. General: Provide material from Custom Elevator.
- B. Microprocessor: Provide a microprocessor-base unit for operational and communication functions. Provide a microprocessor-base unit for operational and communication functions. Provide Custom Microprocessor model.
- C. Software: Provide non-proprietary type.
- D. Service Tool: Provide service tools required for maintenance, testing and troubleshooting.
- E. Drive: Provide four-valve control with solid-state starter for A. C. pump motor.
- F. Position Sensing: Provide digital solid-state type. The operational controller shall maintain the position during a power loss. A LED-type position indicator shall be located in the controller.
- G. Contactors and Relays: Provide D.C. type which shall be sized to insure proper conductivity and reliable operation.
- H. Identifications: Provide permanent non-obstructed markings for all components, including size and type of fuses, identical to those symbols found on the Electrical Wiring Diagrams.
- I. Remote Monitoring: Provide terminals for connection to a remote monitoring system. Provide separate outputs to be connected to the BAS system to signal when the elevator is Not Available for Firefighters' Emergency Operation and Start of Elevator. Also provide keyed switch to override signals for maintenance.
- J. Transformers/Filters: Provide transformers and filters to isolate noise from the electrical system. The wiring shall be copper.
- K. Cabinets: Provide wall mounted NEMA I controller cabinets with hinged doors. Door shall swing as to not block the line of sight with the power unit assembly.
- L. Labeling: Provide UL, CSA or ASME A.17.5 label for all equipment. The labels shall be easily viewed.
- M. Code Data Plate: Provide a data plate that indicates the A17.1 Code to be used for inspections and tests. The data plate shall be of such material and construction that the letters and figures stamped, etched, cast, or otherwise applied to the face shall remain permanently and readily legible. The data plate shall be easily viewed, securely attached in the controller cabinet. The height of the letters and figures shall be not less than 1/8 inch.
- N. State Identification Plate: Mount plate on the front of the controller cabinet in the upper right area.

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- O. Test Data Tag: Provide a tag on the front of the controller with the proper information.

2.4 POWER UNIT ASSEMBLIES

- A. General: Provide material from Custom Elevator.
- B. Tank: Provide submersible type with isolation pads. Oil reservoir shall hold 10 gallons in addition to the oil required to operate the elevator. Provide both the pressure and electrical data plates mounted to the tank.
- C. Valves: Provide a four valve unit which shall be readily accessible for adjustment. Control valves shall be solenoid operated and shall open and close gradually for smooth motion control. Provide test seal for relief valve. Provide valve from Blain.
- D. Pump: Provide a submersible constant displacement rotary screw type.
- E. Muffler: Provide one in the oil line near the power unit to reduce the pulsations and noise present in the flow of the hydraulic fluid. ac.

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Both the stations and the data tags shall be easily accessed from the hoistway landing without getting onto the car.

C. Platforms: Provide steel-type.

D. Car Guide Rails: Provide standard T-type steel rails with brackets for attachment to building structure. Provide any backing or intermediate tie brackets.

E. Car Guide Assemblies: Provide roller-type which allows front-to-back and side-to-side adjustment of each guide. Each arm shall be spring mounted with adjustable stops. Rollers shall operate at less than 250 rpm. Guide assemblies shall be designed maintain guidance with the loss of the roller.

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- B. Shell: Provide reinforced 14-gage steel with black baked enamel finish. Apply sound deadening to exterior.
- C. Canopy: Provide reinforced 12-gage steel separated into four (4) sections by etching.
- D. Transom: Provide #4 brushed 14-gage stainless steel.
- E. Front Return/Entrance Columns:

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- C. Traveling Cables: The cables shall have a flame retardant and moisture resistant outer cover. Provide pads where necessary to prevent damage to the cables during operation of the elevator.
- D. Terminals: Provide permanent identification at all connections.
- E. CCTV:

- F. Variations: Contractor shall provide written notification of any and all conditions which will prevent producing satisfactory work within the schedule.
- G. Acceptance of Conditions: Contractor shall accept conditions prior to commencement of work. Start of work shall be interpreted as the acceptance of the conditions as they exist.

3.2 INSTALLATION

- A. General: Contractor shall perform all work in a first class workmanship manner.
- B. Standards: Contractor shall install equipment per Manufacturer's standards and in accordance with referenced codes.
- C. Tolerances: Contractor shall install equipment to maintain proper clearances during the operation of the elevator.
- D. Maintainability: Contractor shall install equipment so components may be easily accessed for removal during maintenance and repair.
- E. Cutting and Patching: Contractor shall cut the walls for the fixtures and patch to maintain the fire rating.
- F. Field Welding: Contractor shall utilize certified welders. Oxidation and residue shall be chipped and cleaned away. All welds shall be wire brushed and painted with two coats of primer prior to finished coat.
- G. Un-used Equipment: Contractor shall remove all un-used equipment.
- H. Lubrication: Contractor shall lubricate all equipment.
- I. Wiring: Contractor shall wire equipment as indicated on the electrical wiring diagrams.
- J. Coordination: Contractor shall coordinate all Preparatory Work Not Included In Elevator Contract – Work By Others scheduled during the Installation Period.
- K. Protection: Contractor shall provide protection for non-elevator areas including, but not limited to, lobby walls, lobby flooring. Contractor shall also provide protection for retained elevator equipment including, but not limited to, cab interiors. Contractor shall be responsible for any damage caused during the installation of the elevator. Contractor shall advise Owner of protection procedures to prevent damage or deterioration of elevator work completed during the remainder of the installation period.
- L. Barricades: Contractor shall provide and maintain guarding/barricading of the hoistway openings during construction.

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3.6 FIELD QUALITY CONTROL

- A. General: Contractor shall have the work at the location checked during the course of the installation. Contractor shall coordinate all inspections and reviews.
- B. Progress Reviews: Contractor shall provide personnel for review. Corrective work required shall be accomplished as directed.
- C. Inspections: Contractor shall provide personnel for the elevator inspection and all Acceptance Inspection tests shall be witnessed. Owner shall be notified a minimum of 3 working days prior to the scheduled inspection and testing. Contractor shall complete all corrective work identified by Code Authority during Acceptance Inspection prior to Acceptance Review. Contractor shall pay for additional inspection fees should all corrective elevator work identified not be completed as required.
- D. Acceptance Reviews: Contractor shall provide personnel for reviews. Contractor shall complete all corrective work identified prior to Final Acceptance Reviews.
- E. Final Acceptance Reviews: Contractor shall provide personnel for reviews to verify completion of punchlist.
- F. Warranty Review: Contractor shall provide personnel for one warranty review.
- G. Additional Reviews: Contractor shall compensate Owner for reviews should all corrective work identified is not completed as required.

3.7 CLEANING

- A. General: Contractor shall keep work areas orderly and free from debris during the installation.
- B. Daily Removal: Contractor shall remove packaging and other materials on a daily basis as the equipment is installed.
- C. Daily Cleaning: Contractor shall clean work areas on a daily basis of dirt, oil and grease. Non-elevator areas shall be kept clean at all times.
- D. Final Cleaning: Contractor shall clean machine rooms, controllers, hoistways, pits, hoistway equipment, hoistway entrance assemblies, pit equipment, door operating equipment, cab enclosures and fixtures of dirt, oil, grease and fingermarks prior to Acceptance Reviews.

3.8 DEMONSTRATION

- A. Contractor shall instruct Northwestern 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 University's personnel in normal procedures to be followed in checking for sources of operational failures or malfunctions. Confer with Northwestern on requirements for a complete elevator maintenance program.
 - 1. Interactive Management Computer Training Program: Contractor shall provide one 1-hour session of training at the Location. Training shall include complete instruction on the Interactive Management Computer features

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