UNIVERSITY OF MICHIGAN
ARCHITECTURE, ENGINEERING AND CONSTRUCTION

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Building Name
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SPECIFICATION DIVISION 14

NUMBER SECTION DESCRIPTION

END OF CONTENTS TABLE

EDITOR NOTE:
THIS ELEVATOR SPECIFICATION IS WRITTEN BASED ON PERMANENT MAGNET AC MACHINE, WHICH REPLACED PREVIOUS GEAR STYLE MACHINES. THIS SPECIFICATION CAN BE USED FOR MRL OR MACHINE ROOM (OVERHEAD OR BASEMENT) TYPE TRACTION ELEVATORS, AND FOR PASSENGER OR SERVICE ELEVATORS. USE REQUIRES CAREFUL EDITTING TO MEET PROJECT REQUIREMENTS.
1-9-15: SUBSTANTIALLY REVISED NEW MASTER SPECIFICATION

DIVISION 14 CONVEYING SYSTEMS
SECTION 142123 - ELECTRIC TRACTION ELEVATOR

PART 1 - GENERAL

1.1 GENERAL CONDITIONS

A. The Contractor under this Division of Work (elevator contractor) is referred to the Contract Forms and General Conditions of these specifications, all of which apply to this Division of the Work.

1.2 SCOPE OF WORK

EDITOR:
EDIT THE FOLLOWING TO SUIT THE PROJECT.

A. The work of this division shall consist of the complete removal and replacement (except items specifically noted to be reused) of --- traction passenger elevator(s) in the ***BUILDING NAME*** building. Bidders shall include all labor, materials, permits, and services required for the complete installation of the elevator and hoistway equipment as herein specified.

1. In all cases where a device or part of the equipment is herein referred to in the singular, it is intended that such reference shall apply to as many of such devices or parts as are required to make a complete installation.
2. Elevator installer to obtain all approvals for any required code variances to accommodate this renovation/installation from Michigan Elevator Safety Division at no additional cost to Owner prior to starting construction.
3. Refer to architectural, mechanical and electrical drawings, and coordinate accordingly

B. Two weeks prior to removal of any equipment, elevator contractor must notify U-M elevator department at 734-647-2059. U-M elevator department will tag any parts to be salvaged. Contractor to remove tagged parts, transport parts to building's loading dock, and notify U-M elevator department which in turn shall remove salvaged parts from site. All other equipment will become property of contractor who will remove from site in accordance with all codes and regulations.

C. Related sections and work of other divisions:

1. The elevator contractor shall include all work and materials, except that listed under "Related work by other contractors", for a complete and operational system.
2. Following is a brief description of work by other divisions included in this contract. This work must be done in accordance with the codes having jurisdiction and the approved drawings of the elevator contractor.
   a. Architectural work: See architectural drawings and specifications.
   b. Mechanical Work: See mechanical drawings and specifications.
   c. Electrical work: See electrical drawings and specifications.

3. Elevator Contractor shall coordinate with all other trades working in hoistway, machine rooms and be available to operate the elevator in a running "Platform" manner to allow other trades to complete there work.
4. All telephone cable and conduit between machine room terminals, controller and car shall be provided by elevator contractor.
5. Final Cleaning: Refer to architectural specifications, division 1, and also refer to Part 3, item 3.8 of this division.

1.3 CODE AND STANDARD OF REGULATORY AGENCIES

A. Applicable elevators codes that are in effect based on the time the permit is drawn shall govern the installation process.

B. Provide a copy of testing documents to the elevator shop at the time of testing.

C. Perform work in accordance with applicable codes, the State of Michigan Elevator Code, the National Electrical Code, and the American Society Mechanical Engineering Safety Code for Elevators, and Escalators ASME A17.1 as adopted by the State of Michigan as referenced therein and all of the provisions in the University of Michigan's Standard General Conditions.

D. Give all necessary notices, obtain State and Municipal permits, pay fees in connection with the installation, including sales and use taxes as applicable, and make tests as are called for by the regulations of such authorities. These test(s) or inspection(s) shall be made in the presence of the authorized representative of such authorities and the owner's representative. It is the responsibility of the elevator contractor to provide any variances from the Governing Authority that could be necessary for a complete acceptable elevator installation. Also refer to Part 3, Item 3.7 of division 14.

E. Elevator Guidelines to Ensure Accessibility by People with Disabilities.

1. Elevators shall meet the guidelines of the Americans with Disabilities Act using the Uniform Federal Accessibility Standards (UFAS) relevant to elevator (section 4.10 Elevators) as the technical requirements.
2. Elevators shall meet the requirements of the State of Michigan Department of Labor Building Code relevant to barrier free design and elevators. Section 512.10.

1.4 SAFETY AND SECURITY REQUIREMENTS:

EDITOR:
TO BE MODIFYING FROM DIVISION 1.

A. The building may be occupied and used by occupants throughout the construction period.

B. Comply with the following safety and security requirements for work conducted in occupied buildings and related areas:

1. Schedule Work with owner through construction Engineer.

2. Building Access: During regular business hours (6:30 AM through 5:30 PM; Monday through Friday, except University-recognized holidays), notify Owner's Representative for access to Project site.

C. Individual areas can be opened as often as once each day by the Owner's building facilities manager. When more frequent daily access is required, or when access is required for more than 5 working days, obtain keys from the University Key Office. When working in more than one area, check with the building facilities manager to ensure no scheduling conflicts exist.

1. Building access outside of regular business hours and on weekends is available only with the written approval of the Owner's Representative. Coordinate access with the Owner's Representative and the Owner's Public Safety Department.
2. Security: Purchase University-provided photographic identity badges for each person engaged in on-site work, and ensure that workers wear badges at all times on University property. Coordinate through Owner's Representative.
   a. Badges are required in occupied buildings when the Contract Time is longer than 1 week.
3. Work activities shall not result in excessive noise, vibration, odors, smoke fumes, etc. in occupied areas. Offending work must be stopped, and rescheduled after off-hours completion: 5:30PM to 6:30AM.

D. Personnel Restriction:

1. Personnel Conduct Restrictions: Employees of the Contractor and subcontractors shall comply with the following restrictions regarding personal conduct while on University of Michigan property.
2. Smoking: Smoking is strictly prohibited except in specially designated areas. In effective of July 1st, 2011 the all campus will be smoke free.
3. Harassment: Conduct considered by the Owner as harassing is strictly prohibited, including the use of profanity; or the use of derogatory or demeaning gender or race-related comments or actions. The Owner reserves the right to require the Contractor, at no additional cost to the Owner, to remove from the Project all personnel who violate this policy.

1.5 GUARANTEE

A. The elevator contractor shall guarantee that the materials and workmanship of the apparatus installed by him meet the specification, and that he will repair any defects not due to ordinary wear and tear or improper use or care, which may develop within warranty from date of final payment or extended new product service period.

1.6 SCHEDULING OF OPERATIONS

A. Contractor must note that the building may be occupied at all times. Construction scheduling is of utmost importance. Refer to bid documents for special conditions and additional information. During the progress of the work, job meetings will be subject to call between the Owner's representatives, and the Contractor's representatives. The Contractor shall provide a representative to attend meetings held from time to time for the purposes of schedule coordination and consideration of technical and construction matters. The Contractor's representative shall be the job superintendent or other person who is authorized to act as the agent of the Contractor.

B. Dates:

EDITOR:
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1. Start and completion on project, refer to bid documents.
2. Any elevator shall not be out of service continuously for more than 4 months.

C. Sequence of work:

1. Work on one elevator at a time.
2. Therefore one elevator system will always be working while the other one is being worked on.

D. Work restriction shall be verified with building documents.

EDITOR:
EDIT THE FOLLOWING TO SUIT THE PROJECT IF THERE IS MORE THAN ONE CAR.

E. The elevator contractor shall be responsible for all elevator equipment maintenance and repair when the elevator contractor has been on site.

1.7 NEW PRODUCT WARRANTY SERVICES

A. After completion of the installation, warranty and 24-hour callback service for the equipment furnished under this specification shall be provided for a period of twelve (12) months as part of this Contract. This service shall also include regular biweekly examination. Provide minimum of (26) inspections in the one-year period. In the event the 26 site visitation are not completed the elevator contractor will extend his warranty covering all callbacks, repairs, parts, testing, labor and any other item necessary to keep the elevator in like new condition until the twenty-six warranty site visitation have been completed. Advise U-M elevator department each time before and after completion of service (of the installation during regular working hours by trained employees of this Contractor, and shall include all necessary adjustments, greasing, oiling, cleaning, supplies and parts to keep the equipment in proper operation, except parts made necessary by misuse, accidents or neglect caused by others). Contractor shall provide written record of work performed signed by the elevator shop after each visit.

B. All warranty service must be performed by the installers and not by any other services agency. Also, the installer must have an established maintenance and service organization available for performance in the City of Ann Arbor that can provide regular and emergency service, 24 hours a day, every day of the year.

C. It is the responsibility of the U-M elevator department to respond to any emergency regarding elevators. In the event that someone is trapped in an elevator that is under contracted warranty, the University Elevator Department will respond to free the passengers as soon as possible to minimize the inconvenience to users. It is within the right of the University to remove covers, open doors, install monitoring equipment, etc. However, all of this work shall be performed by elevator journey person licensed by the State of Michigan.

D. A detailed record of work performed by University Elevator Mechanics is maintained in the Elevator Shop. Contractors shall contact U-M Elevator Shop for work performed by University Elevator journey person.

E. The elevator contractor shall be responsible to service and maintain all elevator emergency circuits (including the fire service circuit, related equipment and sensors) as part of the regular elevator warranty services contract.

F. The warranty services start after the completion of the 2nd car.

1.8 SUBMITTALS

A. Before beginning fabrication and work, the elevator contractor shall prepare drawings that show the arrangement of the elevator equipment. Approval of drawings and other data (summit minimum of eight sets), which are to be submitted by the elevator contractor to the owner representative, must be approved by U-M engineer/architect. Before proceeding with fabrication and installation of the equipment. Field verify existing conditions and sizes prior to preparation of drawings.

B. Samples:

1. Submit one samples of car wall construction, car floor tile and enamel colors.
2. Do not proceed with the orders until samples are approved by U-M engineer/architect.

C. Shop Drawings:

1. Submit eight (8) copies of Shop Drawings as required showing the general and detailed arrangement of all elevator equipment. Show ceiling, lighting, signal fixtures, and smoke detectors including routing of exposed conduit and all material.
2. Show dimensions, weights, and indicate who will perform the work of each item.
3. Statements to the effects of work by other shall not be accepted; you must identify who is responsible for the work.

D. Product Data: Submit the manufacturer's specification and data sheets, and standard details. Include pictures, catalog cuts, or other suitable illustrations of all elevator equipment that will be exposed in the finish work, including car, hoistway entrance, and signal and control apparatus. Also include these items in bound set.

E. Certificates:

1. Furnish without cost to the Owner all certificates necessary as evidence that the elevator conforms to the applicable laws, ordinances, and requirements.
2. Provide a copy of certificate and State permit to the elevator shop.

F. Operation & Maintenance Manuals:

1. At completion of work provide four complete project and specification sets (bound and properly arranged) of the parts lists and operator's manuals, copies of approved shop drawings, prior to receiving final payment. Following is a brief summary of items:
   a. Legible schematic wiring diagrams including all changes made during installation.
   b. Description of operation of elevator system installed.
   c. Hoisting machine: Including Motor, Brake, Geared Machine and associated devices such as Tach Motors or Monitors.
   d. Deflector Sheaves, Governor and Governor Tail Sheaves, Safeties, Buffers.
   e. Counterweight Assembly, Guide Rollers on Counterweight and Car, Cable Shackles. Safeties and rope brake or other approved emergency stopping device.
   f. Controller and Selector: Including parts information on Relays, Printed Circuit Boards, Reverse Phase Relays, Switches, Lamps, Electrical Cables, Monitors, Modems, Diagnostic Hardware, Diagnostic Software, and Overload Protection Devices.
   g. Door Assemblies: Including Hangers, Rollers, Door Motor, Door Operator, Door Clutch Assembly, Door Closers, Door Drive Arms, Related Hardware, Sheaves, Door Guides, Interlocks, Safety Door Edge.
   h. Signal Equipment: Including Car Station, Hall Stations, Position Indicators, Direction Indicators, Fire Service Panel, Smoke Detectors, Key switches, And Pushbutton Assemblies.
   i. SCR Drive Units, Transformers, Chokes.
   j. Car Top Inspection Station, Limit Switches, Solid State Leveling Control Units, Leveling Switches, Cabs, Door Sling, Platform, and Alarm Bell.
   k. Provide a Laptop computer and demonstrate the elevator system operation to owner personnel as part of training.
2. Maintenance records shall document compliance with ASME A17.1 section 8.6 including maintenance control diagram.
3. Additional O&M manuals will be required per each machine room.

1.9 ACCEPTABLE PRODUCTS

A. Fixtures (Car Operating Panel, Hall Push Button): PTL Performer or Innovation Industries. All shall be Vandal Resistant.

B. Controller: Motion Control Engineering I Format or Model VVV for flux vector and remote diagnostics or Galaxy Controls by GAL, or SmartRise controllers or Virginia control or Elevator Controller Pixel Controllers. All diagnostics shall be compatible with the laptop PC that will be provided and shall be equipped with Campus view.

C. Door Operator & Equipment: GAL Manufacturing Corp. MOVFR Operator, car and hall door tracks, car and door hangers with roller assemblies. Allinterlocks, pickup rollers and operating linkage manufactured by GAL.

D. Hoist Machine: Manufacturer's standard that complies with all duty requirements of this Section and manufactured by Hollister Whitney or Imperial Electric.

E. Variable Speed Drives: With all applicable options, or as approved by controller manufacturer.

F. Door Protective Device: ICU/Gatekeeper 3D from Adams Elevator Equipment Company or Janus 3D.

G. Telephone: RATH Microtech 2100-957-CC telephone integral of cabinet with Rath 2100-Alarm as part of the phone and elevator communications failure. See Item 2.6.D.

H. Roller Guides: Elsco Model "A" on car and Model "B" on counterweights.

I. Car Top Inspection Station: Adams Model A-912CG.

J. Floor Announcement System: Shall be through chime and voice announcements, by Adams or approved elevator controller manufacturer and shall be approved by University of Michigan engineer.

K. Cab Manufacturers:

1. G & R Elevator Mfg.
2. Haunstein Burmeister
3. Tyler
4. Columbia
5. Eklund

PART 2 - PRODUCTS

2.1 SCHEDULE OF NEW EQUIPMENT

EDITOR:
EDIT THE FOLLOWING TO SUIT PROJECT.

A. Elevator Number: Existing State Number ____

B. Type of Service: Passenger/ Freight (Dormitory)

C. Elevator Type: Overhead, traction, geared, machine located on ___floor (Room number _____)

D. Quantity: ----

E. Capacity: ------ pounds

F. Speed: Minimum ---- FPM

G. Travel: ------ + or - (Field verify)

H. Number of Stops: ----

I. Number of Door Openings: -----

J. Floors Served: -,-,-,-

K. Main Floor Egress: _____; Alternate Floor Egress: _____.

L. Hoistway Size: _____long x _____wide (to edge of sill) - Approx. Existing; Field Verify

M. Pit Dimensions: _____long x _____wide x _____deep (Field Verify)

N. Platform Size: _____long x _____wide

O. Car Interior Dimensions: _____long x _____wide x _____ high (dimensions to match existing). Field verify

P. Car Door Size/Operation: _____wide x _____high

Q. Door Opening Type: Single Speed, Center Opening (match landing size)

R. Machine Type/Location: Gearless PMAC/Overhead

COORDINATE POWER SUPPLY WITH THE ELECTRICAL TRADE.

S. Power Supply: --- Volts/ 3 Phase/ 60 Cycle; Motor Horsepower: ---

T. Fire Fighter Service: Yes

U. Independent Service Operation: Yes

V. Load Bypass Operation: Yes

W. Anti-nuisance Feature: Yes

X. Special key Switches: Yes, (two key switches per floor, one for security on & off, one for momentary override).

2.2 GEARELESS HOISTING MACHINE

A. Gearless Machine "PMAC":

1. The machine shall be a Permanent Magnet, Synchronous Design, and AC Gearless Traction Elevator Machine.
2. The traction driving sheave and brake drum shall be mounted to the motor shaft. Motor will be mounted to a structural bed plate of sufficient design for compliance with ASME A17.1.

3. Machine should be totally enclosed, self-cooling without the use of auxiliary fan(s) for cooling.
4. Gearless machine demountable drive sheave shall be cast form the best grade of hard cast iron, semi steel or cast steel of approved composition and shall be machined with grooves, providing maximum traction with a minimum of cable and sheave wear. The surface of sheaves shall be tested individually for hardness and the actual hardness to be plainly stamped next to the grooves on the sheave rim. The hardness must measure between 220 and 240 Brinell.
5. The diameters of the Gearless machine driving sheave shall be not less than forty (40) times the diameter of the hoisting rope.

B. Motor: The motor shall be designed for elevator service. Motor shall be one hour rated, class F insulation. As specified by elevator controller manufacturer.

C. Brake: Provide machine with a spring applied and electrically released electromechanical brake so designed as to be effective to the extent of stopping the car during emergency stop and holding the car under all conditions of loading or operation. Design brake electromagnet for quick release to provide smooth and gradual application of the brake shoes. Brake shall be individually controlled and able to hold 125% of rated capacity. The brake drum must have the wearing surface and edge of flange turned smooth, and the wearing surface must run true within a minimum variation of .005 inch. Brake shoes are to be lined with non-asbestos bonded type linings. Brake plunger rod shall be polished steel with surface free of machine marks. An emergency brake or rope brake shall be provided as per ASME A17.1.

D. Machine Location and Foundation/Bedplate: The elevator machine shall be placed directly over the hoistway upon structural steel beams. The bedplate shall consist of structural steel members fabricated into a rigid unit designed to minimize deflection.

E. Isolation: The machine bedplate shall rest on isolation pads of proper density to effectively isolate the machine from the building structure.

F. All exposed surfaces of machine, motors and governor shall be painted with rust-resisting gloss, gray color enamel after installation.

G. Machine shall not have any name or logo printed or other than University of Michigan made a part of any device supplied under these specifications.

H. Hoisting Machine Acceptable Manufacturers:

1. Hollister Whitney or Imperial Electric.

2.3 PROGRAMMABLE CONTROLLERS FOR AC TRACTION ELEVATORS:

A. Controller Description:

1. The controller shall use a variable voltage variable frequency drive or flux vector for the control of three phase AC induction motors.

2. The drive shall use a three-phase, full-wave bridge rectifier and capacitor bank to provide a bus for the solid-state inverter.
3. The drive shall use power semiconductor devices and pulse width modulation, with a carrier frequency of not less than 2kHz, to synthesize the three-phase, variable voltage variable frequency output to operate the hoist motor in an essentially synchronous mode.
4. The drive shall have the capability of being adjusted or programmed to achieve the required motor voltage, current and frequency, in order to properly match the characteristics of the AC elevator hoist motor.
5. The drive shall not create excessive audible noise in the elevator machine motor.
6. The drive shall limit the total harmonic distortion (THD) reflected back into the power system to the following values at any motor speed from 50 to 100 percent.
   a. Drive input voltage waveform: Less than 3 percent THD.
   b. Drive input current waveform: Less than 100 percent THD.
7. The elevator contractor shall provide at no additional cost any additional devices required to meet the above THD limits.
8. The drive shall be a heavy-duty type, capable of delivering sufficient current required to accelerate the elevator to contract speed with rated load. The drive shall provide speed regulation appropriate to the motor type.
9. 9. The regenerated power from the elevator shall be of benefit to the building. The regenerative power shall not be dissipated in a resistor ban but will be returned to the building electrical system. Steps shall be taken to provide equipment so the regenerated power does not adversely affect other equipment in the facility, steps such as the use of the filter network and or isolation transformer shall be used.
10. A contactor shall be used to disconnect the hoist motor from the output of the drive each time the elevator stops. This contactor shall be monitored and the elevator shall not start again if the contactor has not returned to the de-energized position when the elevator stops.
11. All power feed lines to the brake shall be opened by an electro-mechanical switch. A single ground, short circuit or solid-state control failure shall not prevent the application of the brake.
12. The controller shall provide stepless acceleration and deceleration and provide smooth operation at all speeds.
13. The power control shall be arranged to continuously monitor the performance of the elevator in such a way that if the car speed exceeds 150fpm during access, inspection or leveling, the car shall shut down immediately, requiring a reset operation.

EDITOR NOTE: THE FOLLOWING PARAGRAPH HAS BEEN USED FOR SELECT PROJECTS WHERE PIT HEIGHT WAS LOWER THAN 48”. EDIT CAREFULLY OR DELETE.

14. The controller shall be arranged to continuously monitor the performance of the elevator in such a way that the car speed shall not exceed 150fpm during travel down from the -- floor to the Basement floor for elevators ----.

15. The automatic leveling zone shall not extend more than 12" (304.8mm) above or below the landing level nor shall the doors begin to open until the car is level with the landing. In addition, the inner leveling zone shall not extend more than 3" (76.2mm) above or below the landing. The car shall not move if it stops outside the inner leveling zone unless the doors are fully closed and locked.
16. The system shall use an automatic two-way leveling device to control the leveling of the car to within 1/4" (6.35mm) or better above or below the landing sill. Overtravel or undertravel shall be compensated for and the car brought level to the landing sill.
17. The appropriate landing system shall be used with this controller and shall be of steel tape type. Or approved type from controller manufacturer.
18. Automatic Operation of the Car Lighting shall be provided meeting the requirements of ASME A17.1. The Feature shall allow the car lights to be turned off when the following conditions exist for not less than five minutes: the car is at a floor, the doors are closed, there is no demand for service and the car is on automatic operation. Momentary interruption of any of these conditions will cause the car lights to be turned on. The Automatic Operation Feature shall be able to be turned on or off as desired by the owner from the Elevator Controller.

B. Specifics For Closed Loop System:

1. Provide a closed loop tachometer feedback control. The control system shall continuously monitor the elevator speed signal from a velocity transducer and compare it with the intended speed signal to verify proper and safe operation of the elevator and to correct the actual speed to match the intended speed.

EDITOR:
DELETE THE FOLLOWING TO SUIT PROJECT IF THE SPEED 150FPM OR ABOVE.

C. Specifics For VVVF Drives (For speeds of 150fpm or below):

1. NOTE: For VVVF applications, the AC motor shall have slip specifications between 8 percent and 12 percent, or a NEMA rating of "D".
2. The VVVF drive shall be capable of providing a braking pulse to use in the stopping sequence of the elevator. The braking pulse shall take the form of an adjustable DC current pulse applied to the AC motor for an adjustable period of time (0 to .75 second).
3. The VVVF drive shall be able to be programmed with different volts per hertz patterns, which shall be used to adjust the drive control characteristics.

EDITOR:
DELETE THE FOLLOWING TO SUIT PROJECT IF THE SPEED 150FPM OR BELOW

D. Specifics For Flux Vector Drive (For speeds over 150fpm) NOTE: For flux vector applications, the AC motor shall have slip specifications of 5 percent or less, or a NEMA rating of "A" or "B".

1. The flux vector drive shall be capable of producing full torque at zero speed.
2. The flux vector drive shall not require DC injection braking in order to control the stopping of the car.
3. The flux vector drive shall utilize encoder feedback to regulate hoist motor speed. The encoder shall be mounted to the motor shaft.

E. The controller shall be UL, ETL or CSA listed, and shall meet FCC part 15 subpart J limits for radio frequency interference.

F. Provide fluorescent lighting at the front and back inside the controller cabinet. Ventilation fans shall be part of the controller cabinet.

G. Controller: Motion Control Engineering I Format or Model VVV for flux vector and remote diagnostics or Galaxy Controls by GAL, or SmartRise controllers or Virginia control or Elevator Controller Pixel Controllers. All diagnostics shall be compatible with the laptop PC that will be provided and shall be equipped with Campus view.

H. Drives: Provide as recommended and approved by controller manufacture.

I. Elevator controller is to be factory equipped with provisions for emergency power connections and be able to prevent regenerative power back into line.

J. Phase protection: Provide 3-phase power monitor for elevator power which monitors phase loss, low and high voltage, phase reversal, phase unbalance, and has both manual and automatic reset. Leave in manual position.

EDITOR: DELETE THE FOLLOWING IF YOU DO NOT HAVE EMERGENCY POWER.

K. Emergency Power: When emergency power is detected, cars shall sequentially return to the main lobby one elevator at a time, and remain there with doors open. While each car is being returned, all other cars shall be shut down so as not to overload the emergency power generator. Once all cars have been returned to the lobby, one car may be selected to run under emergency power. Selection of the car that runs under emergency power shall be done automatically by the group system. This automatic selection may be overridden through manual selection. Refer to Mechanical drawings and detail sheets M --.

L. Elevator contractor shall obtain necessary variances to address the reaction toe guard and provide safety switches in the safety loop that will prevent the elevator from running should the toe guard not extend or retract as applicable when leaving or approaching the lowest landing, if contractor has the ability to provide another guaranteed method to address safety concerns with a shorter toe guard and will approved by the State of Michigan Elevator Safety Division then the university will consider this option

M. Auxiliary Operations:

EDITOR:
FILL OUT THE EGRESS FLOOR AND THE ALTERNATE FLOOR.

1. Firefighter's Service:
   a. The following operation is for the use of firemen and other authorized personnel per ASME A17.1.
   b. Automatic passenger elevators shall conform to the following:
      1) Provide a three position (on, off, and re-set) key-operated switch at the main floor for each single elevator or each group of elevators. The key shall be removable only in the "on" and "off" positions. When the switch is in the "on" position, the elevators controlled by this switch and which are on automatic service shall return non-stop to the main floor, and the doors shall open and remain open.
      2) An elevator traveling away from the main floor shall reverse at the next available floor without opening its doors.
      3) Elevators equipped with automatic power-operated doors and standing at a floor other than the main floor, with doors open, shall close the doors without delay and proceed to the main floor.
      4) Door reopening devices for power-operated doors, which are sensitive to smoke, heat or flame shall be rendered inoperative.
      5) All car and corridor call buttons shall be rendered inoperative and all call register lights and direction lanterns shall be extinguished and remain inoperative.
      6) The University Elevator Shop will supply to the installing contractor a "Security Box" (key box) for installation at the egress floor.
      7) A car stopped at a landing shall have its "Emergency Stop Switch" rendered inoperative as soon as the doors are closed and it starts toward the main floor. A moving car, traveling to or away from the main floor, shall have its "Emergency Stop Switch" rendered inoperative immediately.
      8) A sensor in each elevator lobby, which when activated prevents cars from stopping at that floor, shall not be substituted for the above requirements.
   c. Sensing Devices: In addition to the key-operated switch required in "b" above, heat and smoke or products of combustion sensing devices shall be furnished and installed by fire alarm contractor in each elevator lobby at each floor, and the main floor (Note - Egress floor is --- floor) alternate floor for the elevator is --- floor. The activation of a sensing device in any elevator lobby shall cause all cars in all groups that serve that lobby to return non-stop to the main floor. The key operated switch when moved to the "Re-set" position, shall restore normal service independent of the sensing devices. Sensors at each floor shall be connected separately from sensors at main floor. Smoke detectors shall be photoelectric type, supplied by fire alarm contractor. Submit drawings showing locations of smoke heads and exposed conduit for owner's approval prior to installation.

d. Provide a three position (off-hold-on) key-operated switch in each car fire service compartment per ASME A17.1 and shall be effective only when the main floor key-operated switch is in the "on" position or a sensor has been activated and the car has returned to the egress floor or other approved level. The key shall be removable in all positions, and shall not change the operation until the car is at a floor with doors fully opened.

e. The operation of elevators on Fire service shall be as follows:
   1) An elevator shall be operable only by a person in the car.
   2) Elevators shall not respond to elevator corridor calls.
   3) The opening of power-operated doors shall be controlled only by continuous pressure "open" buttons or switches. If the switch or button is released prior to the doors reaching the fully open position, the doors shall automatically re-close. Open doors shall be closed by continuous pressure on "Door Close" switch or button.
   4) Means shall be provided to cancel registered car calls.
   5) When the switch is in the 'hold' position, the car shall remain at the floor with its doors open.
   6) Elevators can be removed from individual car fire service by moving the key-operated switch to the "off" position and the car is at the main floor or other approved level.

f. The switches required above shall be operated by the same key but are not a part of a building master key system. There shall be a key for the main floor switch and for each elevator in the group and these keys shall be kept on the premises by persons responsible for maintenance and operation of the elevators, in a location readily accessible to authorized persons, but not where they are available to the public. TURN OVER ALL KEYS TO PROJECT ENGINEER.

g. Instructions of operation shall be provided as required by code.

2. Elevators arranged for dual operation shall:
   a. Conform to the automatic operation described above when on automatic operation.
   b. When firefighter's emergency operation is activated and the elevator is on independent or inspection operation the elevator shall be provided with a signal system consisting of both visual and audible types to alert the attendant to close the door and return non-stop to the main floor or other approved level. Provisions shall be made to alert the attendant in the same manner when a heat and smoke or products of combustion sensing device is activated.
      1) Floor Fire Service:
      2) Alternate Floor Fire Service:
      3) The activation of a sensing device at the lobby (item 2. above) shall cause all elevators to return non-stop to the alternate floor and the doors shall open and remain open. (The alternate fire service floor shall be defined as any building floor other than the main fire service floor) which will be ---- floor.

4) Operation of the elevators shall conform to "Firefighters Service". When sensing devices are activated, the elevators shall return non-stop to the designated main floor and the doors shall open and remain open. When building sensors activate at the main fire service floor, elevators shall automatically be dispatched to that building's --- floor, which has been designated "alternate" fire service floor where the elevator doors shall open and remain open.

N. Independent Service Operation:

1. Independent service operation shall permit one or more elevators to be removed from the group control and used without interfering with the normal operation of the remainder of the group.
2. Provide a two-position switch in the car-operating panel for each elevator.
3. When the switch is placed in the independent service position, the mode of operation shall be amended as follows:
   a. The car is disconnected from the group supervisory system.
   b. Existing car calls shall be canceled.
   c. The cars shall bypass landing calls.
   d. Continuous pressure on the car button of the selected floor shall close the doors and start the car toward the selected floor. Pressure shall be required on the button until the car starts. Releasing the car button before the car starts shall cause the doors to automatically reopen.
   e. After the car has arrived at the floor and the doors have automatically opened, the cars shall remain at the floor until another car button is pressed or until the key switch is returned to the normal position.
   f. Should all cars be put on independent service, all hall calls registered shall be canceled. Further registration of hall calls shall be inhibited.

O. Load Bypass Operation:

1. Shall automatically delete hallway call buttons when car is loaded to its limit. Load bypass operation shall be adjustable from the controller to adjust the load at which to bypass hall calls not delete them.

EDITOR:

DELETE THE FOLLOWING IF YOU DO NOT HAVE EMERGENCY POWER.

P. Emergency Power Panel For Fire Service:

1. Emergency switch and annunciation panel shall be a 24"x24" brushed stainless steel, with lockable cover, fully recessed panel to be located on the egress floor where indicated on drawings. The panel shall have indicating red lights showing locations of cars during emergency power condition.
2. A key switch shall have auto, manual, 1, 2 & -***NO. OF ELEVATORS***.
3. The panel shall be labeled as "Elevator Emergency Panel".
4. See details on sheet ---.

Q. Anti-Nuisance Feature:

1. Provide an anti-nuisance operation to prevent the elevator control system from responding to a faster than normal rate or registration of car calls. The "normal" rate of registration of car calls shall be programmable on an individual elevator basis within the group.
2. If the anti-nuisance monitor determines that the rate of registration of car calls is excessive as compared to the pre-programmed rate of car calls, all car calls shall be canceled and shall be required to be reregistered.

R. Automatic Two-Way Car Leveling:

1. Each elevator car shall have two-way leveling to automatically bring the car to a stop approximately level with any floor for which a stop has been initiated, regardless of load, rope stretch, or direction of travel.
2. Automatic leveling control shall permit the synchronization of door opening with the stopping of the car at a floor.

S. Machine Finish and Painting: All exposed surface of machines, motors and controllers shall be repainted after field installation and before acceptance by owner with rust resisting gloss enamel light gray paint.

T. Computer For Elevator Controller Diagnostics:

1. Provide a Dell Laptop, Model "Dell Latitude E6420" with Intel vPro Advanced Systems Management loaded with Diagnostics software for the installed elevator controller.
2. Laptop Requirements:
1. Provide a Dell Laptop, Model "Dell Latitude E6420" with Intel vPro Advanced Systems Management loaded with Diagnostics software for the installed elevator controller.
2. Liftnet monitoring system shall be installed and operational by elevator contractor.
3. Laptop Requirements:
   a. Dell Latitude E6420
   b. Operating system Genuine Windows 7 professional, no media, 32-bit, English.
   c. Primary Storage: 250GB 5400rpm Hard Drive
   d. Processer Branding: Intel Core i5 vPro Label.
   e. Processor: Intel Core i5-2520M (2.50GHz, 3M cache) with turbo Boost Technology 2.0.
   f. LCDs: 14.0" HD Anti-Glare LED backlit.
   g. Memory: 4.0GB, DDR3-1333MHz SDRAM, 2, DIMMS
   h. Internal Keyboard: Inertial English keyboard Dual Pointing Keyboard
   i. Primary Optical Device: 8X DVD+/-RW w/Roxio and Cyberlink Power DVD, no media.
   j. Wireless LAN: Intel® Centrino® Advanced-N 6205 802.11a/b/g/n Half Mini Card
   k. Energy Star & EPEAT: Energy star 5.0 Enabled / EPEAT Gold
   l. USB Optical Mouse
   m. Primary Battery: 6-cell (60WH) Primary Lithium Ion Battery
   n. AC Adapter: 90W /C ADAPTER (3-PIN)
   o. carrying case: Slim Nylon Case (2 Pocket)
   p. Support Services: 4 Year Basic Hardware Service with 4 Year NBD Limited Onsite Service After Remote Diagnosis
   q. 4 year complete care accidental damage protection.
4. Laptop shall be compatible with all new elevator controllers.

EDITOR: DELETE THE FOLLOWING IF LCD SCREEN IS NOT REQUIRED ON CAR OPERATING PANEL.

U. Elite Computer Specs:

1. The display shall utilize a (SIZE). Active matrix TFT screen and be powered by a computer with enough memory to support customer specific text and graphics. The display must interface with the elevator controls to support position, direction and status of the car and or bank. In addition the display must be able to support customer programmable scheduled messages in text or graphic format. The system must have software that allows the customer to change the design and transfer to each display individually.
2. Specification for a computer when interfacing to C.E. Electronics, Inc. ELITE DISPLAY:
   a. Windows XP or better.
   b. Pentium/Celeron 2 GHZ or better.
   c. 512 MB of ram
   d. 100 MB free drive space
   e. Network connection
   f. USB ports-2
   g. CD drive
   h. Keyboard & Mouse
3. Monitor:
   a. 800x600 resolution or better.
   b. 16 bit color or better.
   c. 15 inch or larger
4. Specs on the Elite's:
   a. Processor: Intel Celeron M processor 800 MHz.
   b. Ram: 256 MB Ram DDR-SO-DIMM.
   c. Chipset: Intel 82852GM, 400MHz FSB, integrated graphics
   d. Video Controller: Intel Extreme Graphics2 controller,
   e. Storage: 40 GB notebooks hard drive.
   f. OS: XP Embedded services pack 2.

V. Acceptable manufacturer:

1. Motion Controller Engineering (MCE) I Controller or Virginia Controls or Galaxy Controls by GAL or SmartRise controllers or Virginia control or Pixel Controllers.

2.4 HOISTWAY EQUIPMENT & HOISTWAY ENTRANCES

A. Provisions for Hoistway Access:

1. Elevator door safety plug-lock- Keyway - Furnish and install hoistway door unlocking devices at all landings with Tri-lock MFG. & MAINT. CORP. key NO. 6950 in accordance with requirements of the latest Edition of the American Standard Safety Code for Elevators, Dumbwaiters, and Escalators, and as permitted by the Local Code.
2. The hoistway door-unlocking device shall unlock and permit the opening of the hoistway door from any floor irrespective of the position of the car. The design of the device shall be such as to prevent unlocking the door with common tools. The means for unlocking the door shall be available and used only by inspectors, maintenance, and repair personnel.
3. Access Switches - Furnish and install hoistway access switches and associated devices (at the top and bottom landings in accordance with requirements of the latest Edition of the American Standard Safety Code for Elevators, and Escalators, and as permitted by the Local Code.

B. Top of Car Operating Device:

1. An operating device shall be provided on the top of the car located in the front between the car crosshead and hoistway door, complete with an Emergency Stop Switch, GFCI plug, fire service lamp and buzzer, lamp and guard, a Selections Switch, UP, DOWN and safety operating Buttons. This device shall comply with ASME A17.1 and local codes. Using Adams model A-912CG with Light guard.
2. Operation from the top of the car shall not be permissible unless all electric door contacts are closed.
3. Elevator(s) shall be provided with at least two electric light fixtures and a convenience outlet fixture on the car top. The two light fixtures combined shall provide an illumination level of not less than 10fc measured at the point of any elevator part or equipment, where maintenance or inspection is to be performed from the car top. The light fixtures shall be permanent and be of the fixed or portable type and shall be equipped with guards. The light switch shall be accessible from the landing when accessing the car top.

C. Pit Stop Switch:

1. A switch or switches shall be located in each elevator pit, in accordance with ASME A17.1 and local codes, which when turned to the "OFF" position will cause the electric power to be removed from the elevator motor and brake. This switch shall be lockable in the "OFF" position.

D. Emergency Alarm Bell:

1. Provide an alarm bell with it's own battery source and recharging unit for emergency power unit, mounted on the car. When the emergency alarm bell button in the car is pressed, it shall illuminate and the alarm bell shall sound. Operation shall be in accordance with ASME A17.1 and the State of Michigan Elevator Code.
2. DBA level of the alarm bell (80-85 DBA).

E. Hoisting And Governor Ropes:

1. Provide hoisting suspension means & ropes, specifically designed for elevator service, of sizes and numbers sufficient to comply with the requirements of the Code. The number and sizes of ropes proposed to be used shall be indicated on the shop drawings.
2. Governor ropes shall comply with the requirements of the Code, shall be at least 3/8 inch in diameter, and specifically designed for elevator service.
3. Use only wedge type sockets to fasten the ropes.

F. Counterweights:

1. Elevator shall be suitably counter-balanced for smooth and economical operation by adjusting the quantity of weights. Weights shall be contained in a structural steel frame properly guided with suitable roller guides. The counterweights shall be equal to the weight of the complete elevator car and approximately 40% of the rated load.
2. The counterweight frame shall be equipped with roller guides. Each roller guide shall consist of three wheels, each a minimum of 6" inches in diameter, tired with a durable resilient material. The guides shall be designed as to maintain continuous contact with the guide rails.

3. Manufacturer of roller guide: Elsco model B.
4. If contractor desires to reuse existing counterweights and frame, he/she shall submit a certified letter by a professional structural engineer that they will meet the loads and reactions of the new elevator system and without any defect.

G. Guide Rails:

EDITOR:
REUSE ON REPLACEMENT PROJECTS WHERE POSSIBLE FOR CAR AND COUNTERWEIGHT.

1. Provide steel tee guide rails to meet ASME A17.1 requirements, including suitable brackets and clamps for attachment to the building structure. The guide rails and car frame shall be located such that the car is in balance with guides. The machined tongue and groove joints shall be fitted with machined fishplates fastened to each rail with at least 4 through bolts.
2. All joints shall be located free of interference with supporting clamps and brackets. Shims used to obtain rail alignment shall be designed to remain in position, even through the fastening bolts may be loosened.
3. The guide rails shall be installed and aligned with their machined faces plumb within one-eight of an inch from the top to the bottom of the hoistway.
4. Minimum Rail size shall be 15 pounds per foot for both car and counterweight guides. Upgrade rails based on application.

EDITOR:
DELETE THE NEW GUIDE RAIL IF THE GUIDE RAILS ARE TO BE REUSED FOR CAR AND COUNTERWEIGHT.

5. The car and counterweight guide rails shall be realigned, refinished and cleaned so that the faces of the rails are plumb within one-sixteenth (1/16) of an inch in 100 feet of travel. Refinish rails for smooth operation and paint back plains with black paint.

H. Buffers:

EDITOR:
DELETE IF THE ELEVATOR SPEED IS LESS THAN 200FPM.

1. Provide oil type buffer for speed over 200 fpm, buffers shall be in accordance with ASME A17.1 code. The buffers shall be fastened to steel channels provided and installed by the elevator contractor.

EDITOR:
DELETE IF THE ELEVATOR SPPEED IS OVER 200 FPM.

2. Provide spring type buffer for under 200 fpm, buffers shall be in accordance with ASME A17.1 code. The buffers shall be fastened to steel channels provided and installed by the elevator contractor

I. Normal Stopping Devices:

1. Slow-down and normal stopping devices shall be furnished and installed for each car. These devices shall be so arranged that, as the car approaches either terminal landing, a series of activation devices mounted in the hoistway shall activate bi-stable magnetic reed switches mounted on the car and automatically bring the elevator to a smooth stop at the terminal floor.

J. Final Limit Switches:

1. In addition to the normal limit stops, a hoistway final limit switch shall be installed at the top and at the bottom of each hoistway. These final limit switches shall be operated by a fixed cam securely attached to the car. The switches shall be so located that they are operated should the car travel a predetermined distance above or below the upper or lower terminal floor. These limit switches shall be independent of any other stopping devices, shall be positively opened without the use of springs and shall cut off all power from the motors and brakes and prevent the operation of the car in either direction.
2. Final limit switches shall be so located that they open at or about the time the buffer is engaged by the car or counterweight.

K. Deflector Sheaves:

1. Deflector sheave: Provide new deflector sheaves to properly lead the hoisting ropes from the machine to the car and/or counterweight. Sheaves shall be cast iron, accurately machined and grooved for the diameter of ropes used and supported by steel beams furnished in place by the elevator contractor. The bearings shall be permanently lubricated type commonly referred to as (sealed) bearings (non-grease-able type).
2. Existing steel channels at top of hoistway may be reused if engineering data supplied by Elevator Contractor supports their reuse. Guards and beams if reused shall be stripped and repaint.
3. Deflector sheave guard: When deflector sheave extends below the bottom of machine beams, a substantial metal guard shall be provided below the sheave and attached to the sheave supports.

L. Landing System:

1. This landing system shall provide high speed stepping signals, one-floor-run stepping signals, leveling, and door zone signals. Each output signal shall be electrically isolated and shall be capable of reliably operating at 120 VAC.
2. Landing system shall be provided by the elevator controller manufacturer.
3. The system shall consist of a steel tape with mounting hardware to accommodate the complete travel of the elevator, a car top assembly with tape guides and sensors, and magnetic strips for stepping and leveling.
4. The leveling and stopping accuracy of the system shall be within 1/4 inch of the floor level and shall correct for over travel or under travel to within the same accuracy, regardless of load variations or direction of travel.

M. Hoistway Doors:

EDITOR:
FOR NEW HOISTWAY DOOR SERVICES

1. New doors shall be flush hollow metal panels fabricated of No. 16 U.S. gauge steel, minimum. The doors shall be 1-1/4" thick and reinforced with continuous members. Panels shall have sound deadening insulation. Doors shall have removable non-metallic gibs to run in the sill guideway with minimum clearance. Door panels shall conform to the National Elevator Code ASME A17.1 and the Underwriter's Laboratories 1-1/2 hour fire test requirement. Door unlocking devices shall be provided at all floors and as required by local codes. Sight guards shall be provided for all entrances. Provide new hoistway doors at all landings. The doors shall be equipped with nylube door guides.
2. Hoistway landing interior finish shall be painted black.
3. Hoistway landing Doors exterior finish shall be stainless steel.
4. Hoistway door unlocking devices at all landing shall be provided with TRI-Lock removable plugs with key number 6950

EDITOR:
TO BE USED WHEN BI-PARTING FREIGHT DOORS ARE REQUIRED. THIS SECTION IS INFREQUENTLY USED. EDIT CAREFULLY.

N. Hoistway Doors (Freight):

1. The doors shall bear a 1 1/2 hr. UL Label.
2. Doors shall meet ASME A17.1 code requirements.
3. Doors shall be solid panels with resilient edges.
4. Doors construction to be "316" stainless steel.
5. Doors operation shall be power type. Each door shall be electrically operated with two motorized 2-speed door operators mounted on either side of the assembly. An automatic stay-open, feature shall assure that the door stays fully open. All operating mechanisms shall be entirely within the elevator shaft. The controls shall permit immediate emergency manual operation.
6. Rails for the doors shall be steel construction and have adjustable trucking sill stops.
7. Door sections shall be connected to each other with suitable roller chain running over grooved ball bearing sheaves.
8. Door shall be interlocked with the elevator controls to prevent normal operation of the elevator unless all doors are closed and locked, and to prevent door opening when elevator is in motion.
9. Door electrical characteristic is 208v, 3phase, 60cycle, with 30AMP. Circuit
10. Manufacturer: Peelle F10S. Refer to detail on drawings sheet M--.
11. Observation window is to be provided per ASME-A17.1.
12. Door shall be with automatic closing feature, with horn while it is closing. Operation shall be of the sequenced type.

O. Entrances:

1. New entrances shall consist of flush hollow metal door panels, bolted unit type frames, sill's integral hanger(s), hanger covers, fascia plates, headers, struts, sight guards and hardware.

P. Frames:

EDITOR:
FOR NEW FRAMES

1. New unit frame shall be fabricated of No. 14 U.S. gage steel comprising the head and side jamb sections, which shall be securely bolted to from one piece unit construction and shall be securely fastened to the sill and hanger support. They shall be returned on the hoistway side to present a neat appearance.

EDITOR:
FOR REUSE PROJECTS

2. To be reused, sand, fill-in dents and paint matching existing color. Enamel paint to be used. Provide prime coat prior the finish coat for each floor.

Q. Sills:

EDITOR:
FOR NEW SILLS

1. Sills shall be of extruded aluminum construction with a non-slip wearing surface. They shall be supported on steel brackets and securely fastened to the floor. Grooves for the door guides shall have minimum clearance for the guides. The sills must be suitable for "class C3" loading.

EDITOR:
FOR REUSE SILLS

2. To be reused, clean and polish each sill.

R. Struts:

EDITOR:
FOR NEW STRUTS

1. A 3"x3"x ¼" steel angle struts shall extend from the sill to the building beam above and shall be securely fastened to ensure rigidity and adequate support for the header.

EDITOR:
FOR REUSE STRUTS

2. To be reused sand, prime and paint black.

S. Headers:

EDITOR:
FOR NEW HEADERS

1. Header shall be constructed of 3/16" formed steel to provide support for the frame and hangers.

EDITOR:
FOR REUSE HEADERS

2. To be reused sand, prime and paint black.

T. Fascia, covers, and Toe guards:

EDITOR:
FOR NEW FACIA COVERS AND TOE GUARDS

1. Fascia, including hanger covers, toe guards and dust covers shall be fabricated of No. 16 U.S. gauge steel. Fascia shall span the width of the opening plus 6 inches. Dust cover extends a minimum of 8 inches above the header and the toe guard shall extend a minimum 8' below the sill. Both shall return to the wall at 60 deg. Angle.
2. Finish:
   a. Struts, headers, hanger cover, fascia, dust covers, and toe guards shall have matte black finish. New entrance frames (existing) shall be finished in stainless steel of color selected by owner. All landing doors shall be new and finished in enamel of color selected by owner.
   b. All existing heads and jambs shall be stripped to bare metal, prepared with primer and finished with two coats of enamel paint.

EDITOR:
FOR REUSE FACIA COVERS AND TOE GUARDS

3. To be reused sand, prime and paint black or provide new.
4. finish:
   a. All existing headers and jambs shall be stripped to bare metal, prepared with primer and finished with two coats of enamel paint.

2.5 CAR EQUIPMENT & CAR ENCLOSURES:

A. Power door operation:

1. The car and hoistway doors shall be operated quietly and smoothly by an electric operator, which shall open and close the car door and respective hoistway door simultaneously. The doors shall open automatically when the car is leveling at the respective floor and, when operating without an attendant, shall close after a predetermined time has elapsed. Momentary pressure on the "Open Door" button in the car shall cause the doors to remain open or, if closing, to reopen and reset the time interval.
2. The doors shall be opened at rated speed and the closing speed shall be per Code. Door closing force shall be as allowed by code.
3. An electric contact for the car doors shall be provided which shall prevent elevator movement away from the floor unless the door is in the closed position as defined by code.
4. Each hoistway door shall be equipped with an auxiliary door closing device and a positive electro-mechanical interlock to prevent the operation of the elevator until the interlock circuit is established and the doors are locked and closed.
5. Car doors shall be provided with zone looking.
6. Manufacturer: GAL, MOVFR operator.

B. Landing Door Hangers:

1. Each hoistway door shall be suspended by two (2) sheave type hangers. Each hanger shall consist of a polyurethane tread on a metal hub equipped with precision ball bearings mounted onto a steel bracket. The hanger sheaves shall not be less than 3-1/4 inches in diameter. The track shall be so shaped as to permit free movement of sheaves without regard to vertical adjustment of the sheave brackets. An up-thrust roller shall be provided beneath the track and each sheave wheel, capable of withstanding a vertical thrust equal to the carrying capacity of the upper sheave. The up-thrust roller shall be adjustable for fine vertical adjustment and the face of the roller shall be so shaped as to conform to the bottom face of the hanger track. Doors closers shall be sill mounted.
2. Manufacturer: GAL MOVFR operator.

C. Door protection and reopening device:

1. Acceptable products are limited to: ICU/Gatekeeper 2000 from Adams or Janus 3D.

D. Adaptive door timing:

1. Door open times will be varied subject to the call situation causing the stop:
   a. Shortest timing, when car call only causes stop.
   b. Longer timing, when hall call only causes stop.
   c. Longest timing, when coincident hall and car calls exist.
   d. All timing shall meet ADA guidelines as a minimum.
2. The door opening time, measured from the instant the doors start to open until within 1" of fully open position, shall not exceed code standard.
3. Long door and short door "hold open" times shall be set at 4.0 and 2.5 second respectively and shall be ADA complaint.

E. Car sling, safeties and governors:

1. Provide new car sling and safeties.
2. The new safety, of type required by Code, shall be mounted on the bottom members of the car frame and shall be operated by a speed governor located over the hoistway. The safety shall be arranged to stop the car whenever excessive descending speed is attained and means shall be provided to cut off power from the motor and apply the brake prior to application of the safety.
3. Acceptable Manufacturer: Hollister-Whitney or Titan.

F. Car platforms and flooring:

1. Each passenger type car platform shall consist of a structural steel frame with a wood and metal composite floor (i.e. one layer of 3/4" marine grade plywood plus 14 gauge steel plate plus 3/4" thick marine grade plywood plus finish flooring). Top finish flooring on cars shall be furnished and installed by elevator contractor and shall be as described in Item 2.5.J.
2. Each passenger type platform shall be equipped with an extruded aluminum threshold and a steel toe guard at the loading edge. The under side of the platform shall be fireproofed to comply with local codes.
3. The car platform shall be capable for handling the capacity of the car being loaded in one-piece across the entrance of the car and landing.

G. Platform isolation:

1. Each passenger type platform shall be mounted on rubber pads supported on an auxiliary steel frame fastened to the car frame. This arrangement shall form an isolating cushion between the car and the steel car frame.

H. Car and counterweight roller guides:

1. The car and counterweight system shall be provided with roller guides. The guides shall be designed so as to maintain continuous contact with the guide rails.
2. The elevator frame shall be provided with roller guides. Each roller guide wheel shall be 6" in diameter, tired with a durable resilient material. The guides shall be designed so as to maintain continuous contact with the guide rails.
3. Acceptable Manufacturer: Elsco model "A" for car and model "B" for counterweight.

I. car doors:

1. Provide car Doors flush hollow stainless steel panels. Panels shall have sound deadening insulation. Doors shall have removable non-metallic gibs to run in the sill guideway with minimum clearance. Door panels shall conform to the National Elevator Code ASME A17.1 and the Underwriter's Laboratories 1-1/2 hour fire test requirement. Door unlocking devices shall be provided as required by local codes. The doors shall be equipped with nylube door guides.
2. Car door hangers and tracks shall be provided similar to hoistway doors.
3. Doors finish shall be #4, brushed stainless steel.

J. Car Enclosures:

1. All cab material; design, lighting, ventilation and exits shall comply with "American National Standard Safety Code for Elevators, ASME A17.1 and/or local codes. Where codes conflict the more stringent shall apply.
2. Wall panels and reveals shall be of rigidized 316 stainless steel constructions and applied to a steel shell.
3. Returns shall be of stainless steel construction and have a #4 brushed finish. Cutouts shall be provided for operating elements and fixtures. Minimize thickness of return to maximize clear floor area.
4. Canopy shall be constructed from formed and reinforced 16 gauge steel finished in white enamel and shall have an overall height of 8'0" from the finished floor. An emergency exit shall be provided which is locked from the top of the car.
5. Provide LED lighting in 45 degree beveled coves at ceiling and wall corner that will apply 10 foot-candles in the cab at floor level. Total of six or eight lights, four on each side. Coves shall be made of stainless steel with #4 finish and located at ceiling level of cab. Also comply with UFAS lighting level requirements.
   a. LED Model SB-1 Manufacturer by Man-D-Tec.
6. Entrance columns shall be #4 brushed stainless steel finish. Columns shall run from floor to canopy, be finished in a vertical grain, and shall be integral to the returns.
7. Entrance transom shall be #4 brushed stainless steel finish. Columns shall run from floor to canopy. Transom shall run the full width of the car and be finished in a horizontal grain.

8. A single speed fan shall be provided that matches the ceiling and is mounted to the canopy. Air intake to the fan shall be through the 3/8" diameter holes (adequate in number to allow free passage of required air quantity) drilled in canopy. Submit shop drawing of canopy for approval prior to fabrication. CFM as required per ASME A17.1. Sound power is to be 45 DBA max.
9. A 3/8" x 2" bar handrail with radiuses ends of #4 brushed stainless steel finish shall be provided to meet code requirements, on side and back walls but shall not interfere with car operating panel.
10. Car sills shall be extruded aluminum. Car sills for elevator in parking structures shall be nickel silver.
11. Finished floor covering shall be furnished and installed by the elevator contractor.
    a. Flooring shall be "Endura" style rubber tile by Burke Flooring. Texture and color to be selected by owner.
12. Provide removable protective wall pads with padlocks inside elevator car to protect the wall panels. Pads shall meet all codes for elevator car enclosures, and be equal to Palmer "PalmTuff Vinyl Pads". Color to be selected by owner from mfg standards.
13. Acceptable Cab Manufacturers:
    a. G&R Elevator Co.
    b. Haunstein Burmeister
    c. Tyler
    d. Columbia
    e. Eklund

2.6 OPERATING FIXTURES

A. Car operating panel:

1. The operating panel in the car shall consist of vandal resistant stainless steel control panel. (Taper all projected sides of car panel back to return panel for a neat appearance. Submit drawings for approval prior to fabrication.) The main control panel shall contain a series of push buttons with illuminated call registration devices, numbered to correspond to the various landings serviced. In Car Stop Switch, Fire Service Compartment, Alarm Button (connected to a bell located on the car) and a Door Close, Door Open button for each entrance. Alarm bell shall be operated from its own independent battery pack power supply and recharging system. The control panel shall also contain separate key operated switches for Access, independent service, car lights, car fan, emergency light and test switch. Emergency phone shall be hands free type. Panel shall also accommodate certificate frame, hands free phone and digital car position indicator. All key switch cylinders shall be standard Adams fixtures.
2. Buttons shall be made of brushed stainless steel with LED for illumination, with translucent floor designations, with Braille.
3. Provide emergency light in car-operating panel with rechargeable nickel cadmium batteries and recharging system.
4. Provide engraved fire services instruction per ASME A17.1.
5. Acceptable Manufacturers: PTL-Performer series or Innovation Industries. All shall be vandal resistant and brailled.
6. Refer to detail on drawings.

B. Hall push button:

1. ADA compliant vandal resistant illuminating LED type Hall push buttons shall be installed at each floor to permit waiting passengers to call the elevator to the floor.
2. Shall include hall position indicator, LED, Digital.
3. Fixtures shall have up and down buttons with Braille adjacent to the button on the left at intermediate floors and single buttons at top and bottom floors.
4. Buttons shall be made of vandal resistant stainless steel and shall illuminate to indicate a call has been registered. Button shall remain illuminated until the call has been answered. Provide oversized vandal resistant brushed stainless steel cover plates at all push button stations to cover all openings (including the openings that result from removal of existing hall push button stations or any other devices). The Braille signage adjacent to the directional button requires at least half inch lettering denoting the direction of the button
5. Provide engraved graphic (Appendix "O") per ASME A17.1 emergency sign and illustration on all hall push button station plates: "IN CASE OF FIRE USE STAIRWAY FOR EXIT". "DO NOT USE ELEVATOR"
6. Acceptable Manufacturers: PTL Performer Series or Innovation Industries.
7. Refer to details on drawing.
8. Hall push button panel shall accommodate the hall position indicator (HPI).
9. Hallway push button shall be flush wall mounted fixture type.

C. Floor passing chime:

1. Provide a floor-passing chime and voice annunciation to meet ADA requirements. Mount in main car operating panel.
2. Acceptable Manufacturer: Adams Voice or approved Elevator Controller Manufacturer.

D. Communication system (telephone):

1. Provide hands-free vandal resistant emergency telephone in the car, with wiring (shielded pairs) to terminals on control panel in machine room. Engraved with ASME A17.1.
2. Phone shall keep working during power failure. Coordinate work with U-M ITCOM. Phone shall be one push button to talk type and flash when call is answered. Telephone shall be an integral part of the car panel.
3. Annunciator Interface, Auxiliary Relay and 24V LED Board: The board shall be mounted behind the phone in the elevator car operating panel which contains an auxiliary relay that can be tied to DDC panel. The connection from the elevator controller to the DDC panel shall be provided by electrical contractor. When the board is programmed correctly, DDC will receive an alarm whenever the RATH phone detects the phone line has failed. Note that the car traveling cable containing the phone line must be expanded to contain a pair of wires for connection to the nearest DDC panel.

4. Provide a RATH 2100-ALARM unit. Unit shall be mounted in the designated floor elevator lobby per elevator code ASME A17.1 as part of the egress floor hallway push button and shall be wired to the RATH phone in the car operating panel. The alarm unit will contain the code required local alarm light, sounder and a momentary key switch on a label back plate. The traveling cable containing the phone line and pair of wires for the DDC circuit must be expanded to contain a pair of wires from the RATH phone RATH alarm unit.
5. Manufacturer:
   a. RATH Microtech 2100-957-cc telephone (call track), with hand free operation or equivalent.
   b. RATH 2100 Alarm Unit or equivalent..

E. Car traveling lantern:

1. Provide on both sides of car doorjambs and shall be ADA compliant.
2. Manufacturer: PTL Performer series or Innovation Industries Vandal Resistant Series.
3. Refer to detail on drawings.

F. Car fire alarm horn: (omitted)

G. Car position indicator:

1. A LED (Light Emitting Diode) vandal resistant digital type position indicator shall be provided inside car, as part of main car operating panel (COP). It shall indicate the floor at which the car is stopped or passing and the direction the car is traveling. The cover plates shall be #4, brushed Stainless Steel.
2. Manufacturer: PTL Performer Series or Innovation Industries Vandal Resistant Series.
3. Refer to detail on drawings.

H. Special Key Feature:

1. Provide (2) key switches per floor. One shall be for security on & off and one shall be for momentary override. Keys shall be keyed to U of M's KEY SYSTEM and shall be coordinated with KEY OFFICE through Owner Representative.

I. Hall position indicator:

1. Provide at each floor in elevator lobby***OR HALLWAY, ABOVE HOISTWAY DOOR***. Description shall be as in item 2.6.G as part of the hallway push buttons and shall be LED digital type in red color.

2.7 ELECTRIC WIRING:

A. Complete insulated wiring shall be furnished and installed to connect all parts of the equipment furnished by the elevator contractor. Wiring shall conform to the requirements of the latest edition of the National Electrical Code. Include rigid conduit or EMT, at least 1/2" diameter, and short lengths of flexible conduit. Conduit or EMT shall terminate in junction boxes. Conduit, EMT, wiring duct, conduit fittings, enclosures and junction boxes shall be galvanized steel or aluminum.

B. All wiring shall have a flame retarding moisture resisting outer cover and shall be run in metal conduit, flexible metallic tubing, or wire ducts.

C. Traveling cables shall have flame retarding and moisture resisting outer cover. They shall be flexible and suitably suspended to relieve strains in the individual conductors. Provide the required quantity plus at least 10 percent spares. All wiring between telephone cabinet in car and a junction box in elevator machine room shall be provided by the elevator contractor. Conductors shall be numbered to correspond to numbered terminals at the car and machine room.

D. Terminal blocks shall be coded to identify the circuits. Multi-conductor cables shall have the conductor color coded and numbered.

E. The elevator car top shall be provided with a suitable GFCI duplex plug receptacle. Car top lighting shall comply with State of Michigan elevator code requirements.

F. Unless otherwise specified, control wiring shall be a minimum size of #18 AWG. Wire size shall be large enough so that the voltage drop under inrush conditions will not adversely affect operation of the controls.

G. Electrical Receptacle in Car: Provide GFCI duplex electrical receptacle in car. Locate receptacle approximately 2" above finished floor below car operating panel. Provide matching face plate on receptacle.

H. Execution:

1. Install all power wiring in raceway systems. No exposed wiring or conduit shall be run in finished areas without prior written approval of owner.
2. Splice cables and wires only in outlet boxes, junction boxes or pull boxes. (Note - No wire splicing allowed in raceway or wire ducts).
3. Install cable supports for all vertical feeders in accordance with the NEC. Provide Kellum GRIP type supports, which firmly clamp each individual cable and tighten due to cable weight.
4. All terminal strip connections shall be identified with corresponding reference numbers from cable termination chart and electrical straight-line diagrams.

PART 3 - EXECUTION

3.1 ACCEPTABLE ELEVATOR INSTALLERS

A. Acceptable installers: Subject to compliance with the requirements specified herein, installers offering product approved by the Owner are limited to the following listed companies. Elevator installer for project must provide the equipments as specified.

1. Detroit Elevator Co.
2. Kone Elevator Co.
3. Otis Elevator Co.
4. Schindler Elevator Inc.
5. Thyssen Kruup Elevator Co.

***** Note: Above is not a list of elevator manufacturers; it is a list of INSTALLERS only. Elevator installer must provide the equipment specified.

3.2 EXAMINATION

A. Inspect all surfaces, and required embedded anchorage devices, and verify that they are in proper condition to receive the work of this Section. Verify that field measurements are as indicated on approved shop drawings.

1. Prior to preparation of drawings, the contractor shall examine the hoistway and machine room areas and verify that no discrepancies or irregularities exist which would adversely effect the execution of the work.
2. No exposed wiring or conduit shall be run in finished areas without prior written approval of owner.

B. Beginning of installation means acceptance of existing conditions.

3.3 PERFORMANCE

A. Contact speed: Actual speed shall vary no more than 5 FPM from speed specified under any loading condition or direction of travel.

B. Leveling Accuracy: Consistently level within +/- 1/4" under loading conditions.

3.4 ACCESSORIES

A. Provide storage cabinet for the protective pads.

3.5 PERFORMANCE GUARANTEE

A. The elevator contractor shall assume full responsibility to furnish and provide a complete and functional elevator and to obtain and furnish the University final State Elevator Inspection approval. All costs necessary to correct code deficiencies cited by the State Elevator Inspector will be paid by the elevator contractor as part of this Contract at no additional cost to the Owner.

3.6 TECHNICAL TRAINING

A. On site technical training shall be held for the purpose of familiarizing Elevator Support Mechanics with operations and troubleshooting procedures. The session shall accommodate up to ten personnel in each session and consist of forty hours of Training (This to include two 2-day sessions and the fifth day reserved for any additional diagnostic training). Training on equipment controller shall be provided by trained factory service engineers of controller manufacturers through the elevator installers.

3.7 ACCEPTANCE DEMONSTRATION AND PERFORMANCE TEST (COMMISSIONING):

A. Demonstrate to Owner, or Owner's designated representative, the operation of the elevator system. Demonstration shall include:

1. Installation compliance with specifications.
2. Contract speed, capacity, and floor-to-floor performance compliance with specifications.
3. Stopping accuracy and car ride compliance with specifications.
4. Operation of signal fixtures and operation of supervisory or dispatching system.
5. Promptly remove all work rejected by the Engineer for failure to meet specifications and replace the rejected work to comply with requirements, at no additional cost to the Owner. All expenses of repairing work of other Trades damaged by this replacement shall be borne by Contractor.
6. Rejected work which is not made good within a reasonable time, determined by the Engineer, may be corrected by the Owner at Contractor's expense.
7. Upon completion of installation and before final acceptance, conduct a running speed test with full design load to verify compliance with performance requirements. Also refer to Article 1.3 of this division

B. Operating Instructions: Provide instructions to the Owner's personnel, including safety procedures, proper operation of the equipment, and routine maintenance procedures.

C. The laptop computer shall be provided to commissioner prior to start of commissioning process by minimum of (2) weeks. See item 2.3.S.

3.8 CLEANUP

A. Keep work areas orderly and free of debris on a daily basis.

B. Remove filings and loose materials resulting from this work from hoistways.

C. Clean all dirt, oil and grease from machine room and pit equipment and floors.

D. Clean car, car enclosures, entrances, hoistways, operating and signal fixtures and trim of dirt, oil, grease, and finger marks.

E. Polish and shine all stainless steel components.

F. Clean, re-align guide rails for car and counterweight and paint the back of guide rails with black paint.

END OF SECTION