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**ARCHITECTURE, ENGINEERING AND CONSTRUCTION**



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DOCUMENTS

SPECIFICATION DIVISION 14

NUMBER SECTION DESCRIPTION

DIVISION 14 CONVEYING SYSTEMS

SECTION 142123 - ELECTRIC TRACTION PASSENGER ELEVATOR

END OF CONTENTS TABLE

c editor:   
4-2-04: Substantially revised, adopted as new master.

1. DIVISION 14 CONVEYING SYSTEMS
   1. SECTION 142123 - ELECTRIC TRACTION PASSENGER ELEVATOR
      1. General
         1. RELATED DOCUMENTS

INCLUDE PARAGRAPH 1.1.A and b IN EVERY SPECIFICATION SECTION. EDIT related sections 1.1.B to make it project specific.

* + - * 1. Drawings and general provisions of the Contract, Standard General and Supplementary General Conditions, Division 1 Specification Sections, and other applicable Specification Sections including the Related Sections listed below, apply to this Section.
      1. SCOPE OF WORK

spec Editor: Revise the following to suit project.

* + - * 1. The work of this division shall consist of the complete removal and replacement (except items specifically noted to be reused) of \_\_\_\_\_\_\_\_ traction passenger elevator in the \_\_\_\_\_\_\_\_\_\_\_ building. Bidders shall include all labor, materials, and services required for the complete installation of the replacement elevator and hoistway equipment as herein specified.
        2. 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.
        3. Two weeks prior to removal of any equipment, elevator contractor must notify U. of M. elevator dept. at 734-647-2059. U. of M. elevator dept. will tag any parts to be salvaged. Contractor to remove tagged parts, transport parts to building's loading dock, and notify U. of M. elevator dept. 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.
        4. Elevator installer to obtain all approvals for any required code variances to accommodate this renovation from Michigan Elevator Safety Division at no additional cost to Owner prior to starting construction.
        5. Refer to architectural and electrical drawings, and coordinate accordingly.
      1. GENERAL
         1. These specifications cover the complete installation of the elevator system, in accordance with the drawings and as specified herein. 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. Final Cleaning: Refer to Arch. Section 017700 item 1.3.
      2. ACCEPTABLE ELEVATOR INSTALLERS \*
         1. Kone Elevator Co.
         2. Detroit Elevator Co.
         3. City Elevator Co.
         4. Schindler Elevator Inc.
         5. Otis Elevator Co.
         6. Thyssen Elevator (Dover)

**\*** Note 1: Above is not a list of elevator manufacturers; it is a list of INSTALLERS only. Elevator installer must provide the equipment specified.

**\*** Note 2: General contractor shall in his bid name all the sub-contractor during bid opening.

* + - 1. DRAWINGS
         1. 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 (submit minimum of eight sets), which are to be submitted by the elevator contractor to the Owner representative, must be approved before proceeding with fabrication and installation of the equipment. Field verify existing conditions and sizes prior to preparation of drawings.
      2. REQUIREMENTS OF REGULATORY AGENCIES
         1. Perform work in accordance with applicable codes, the State of Michigan Elevator Code, the National Electrical Code, and the American National Standard Safety Code for Elevators, ANSI A17.1-2000 as referenced therein and the provisions in the University of Michigan's Standard General Conditions. 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 tests 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 Article 14.3 of this division.
         2. Comply with "Elevator Guidelines to Ensure Accessibility by People with Disabilities" attached herewith. See Part 15 of these specifications.
      3. GUARANTEE
         1. The elevator contractor shall guarantee that the materials and workmanship of the apparatus installed by him under this specification are first-class in every respect, and that he will make good any defects not due to ordinary wear and tear or improper use or care, which may develop within one year from date of final payment or extended new product service period.

spec Editor: Delete the following article if project is not for Housing.

* + - 1. Special project for U of M Housing.
         1. The building will be occupied and used by student's residence or conferences attendees throughout the construction period.
         2. Comply with the following special safety and security requirements for work conducted within student occupied buildings and areas:

Schedule Work during the hours of 8:00 am through 6:00 PM, 7 days a week, with the following restrictions:

Occupied Buildings: Do not begin work that will generate noise or vibration before 9:00 AM.

Building Access: During regular business hours (7:30 AM through 4:00 PM; Monday through Friday, except University-recognized holidays), notify Owner's Representative for access to Project site.

* + - * 1. 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 Housing Security Department, or from the University Key Office. Use keys to obtain access to areas in strict compliance with approved construction schedule issued to Housing Security. When working in more than one area, check with the building facilities manager to ensure no scheduling conflicts exist.

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.

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. Purchase cost per badge is $3.00. Coordinate through Owner's Representative.

Badges are required in occupied buildings when the Contract Time is longer than 1 week.

Personal Conduct Restrictions: Employees of the Contractor and subcontractors shall comply with the following restrictions regarding personal conduct while on University of Michigan property:

Smoking: Smoking is strictly prohibited except in specially designated areas.

* + - * 1. 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.

spec Editor: Delete the following article if project is not in the Medical school

* + - 1. Special project for U of M Medical School.
         1. Types of special construction requirements include the following:

Use of premises.

Scheduling of work.

Hot-work.

Medical School facilities.

Noise and vibration control.

Protections when using epoxy paints.

* + - * 1. This Section contains requirements that apply to Divisions 1 through 14 and Divisions 21, 22, 23 and 26 of the specifications.
        2. Related Work of other Sections:

Division 1 Section "Summary" for general restrictions on site use.

* + - * 1. USE OF PREMISES
        2. Coordinate use of premises under direction of the Owner's Representative.

The building in which Project is located will be continuously occupied during construction. Coordinate construction efforts with Owner to minimize interference with Owner's operations.

Provide and maintain access of Owner's personnel to toilets, telephone closets and janitor closets on Owner-occupied floors throughout Contract Time.

Maintain emergency egress routes for Owner's personnel as directed by Owner's Representative.

Existing toilets designated by Owner may be used by Contractor's personnel for personal use only during construction. Do not use toilet facilities to conduct construction operations without written permission of Owner's Representative.

If use of toilets for construction activities is permitted by Owner's Representative, clean toilet facilities daily.

Contractor's staging area is strictly limited to areas indicated on the drawings. Where no staging area is indicated, Contractor's use of site is limited to areas within the Contract bounds, or as reasonably required to complete the Work. Strictly comply with Owner's Representative's directions establishing staging and operation areas, through-building routes, and locations for material delivery and disposal.

Arrange parking for Contractor's personnel in accordance with Article 47 of the University of Michigan Standard General Conditions.

Smoking is prohibited in all University of Michigan buildings and on the grounds of selected University campuses, as indicated. Smoking is prohibited at the Project site, including mechanical rooms, utility spaces and roof tops.

Smoking is prohibited on the grounds of the University of Michigan Hospitals and the Medical School Campus.

* + - * 1. SCHEDULING OF WORK

Schedule work with Owner to fit Owner's operations, to facilitate completion of this work, to coordinate with and expedite new construction work on project, and as follows:

Schedule with Owner work that interferes with facility operation, including shut-off of mechanical and electrical services and encumbrance of Owner's ingress and egress routes and normal operation. Provide the following notice of planned interruption of services:

Provide not less than 10 working days' notice before interruption, with final confirmation not less than 72 hours before interruption.

When permitted by Owner's Representative to deliver items of equipment to Owner's loading dock facilities, schedule such deliveries in advance with Owner. Provide minimum 24 hours' notice prior to planned delivery time of equipment.

Schedule work between 7:30 AM and 5:00 PM, Monday through Friday, unless otherwise approved by Owner.

Start of Operations: Do not commence work before insurance and bonds have been submitted to Owner.

* + - * 1. HOT WORK

Hot Work: Perform all Work in conformance with the Owner's "hot work" program as a requirement of Article 53 of the Standard General Conditions. In general, the program specifies special procedures to be used for hot work, including, but not limited to, obtaining permits, preparations, operation and post-operation fire watches.

"Hot work" operations include, but are not necessarily limited to, cutting, welding, brazing, torch soldering, high-speed metal grinding, and other operations using torches, irons, heat guns, or similar open-flame or high-heat generating equipment.

* + - * 1. MEDICAL SCHOOL FACILITIES

Scheduled Suspended-Work Periods: The University's Medical School conducts regularly scheduled academic examinations throughout the year. Certain construction operations to be performed within the Medical Science Unit II Research Wing, second and third floors, are expected to result in noise, vibration, utility shut-offs, and other nuisances that will negatively affect the examination environment.

Upon request of the Owner's Representative, suspend activities conducted within the indicated areas that produce noise, vibration, and other nuisances, or that otherwise have, in the opinion of the Owner, the potential to disturb Medical School examinations:

The precise dates, times, and durations of the work suspension periods are unknown. The Owner's Representative will provide full details of each required work suspension not less than 7 calendar days prior the beginning of the suspension.

Include in the construction schedule 20 working days, of eight hours each, of suspended work time within the areas indicated.

Daily Cleaning Program: In public areas, including lobbies, corridors, elevator cabs, and similar areas used for construction traffic, but outside the limit of the Project, comply with the following:

Either at the end of each working day or before 7:30 AM each working day, broom clean floors using commercial cleaning compound. Wet mop floors after broom cleaning to completely remove dirt, dust, and scuff.

Storage of construction related materials and equipment, including temporary storage of all types, is prohibited outside the Project limits.

Nuisance Control Program: Schedule dust, noise, vibration, and fume generating activities during evenings and weekends. Evenings include the hours from 5:30 PM to 6:30 AM, each Monday through Friday. Weekends include the hours from 5:30 PM each Friday through 6:30 AM the following Monday. Applicable nuisance-generating activities include:

Demolition work, including cutting, coring, asbestos abatement, and debris removal operations.

Use of gasoline or diesel-powered vehicles or equipment.

Utility shut-downs and tie-ins.

Fume/odor generating construction activities, including application of non-water-based paints, epoxy coatings, resinous flooring and similar materials that release significant quantities of volatile organic compounds during application and cure.

Construction activities in public areas (including corridors, lobbies and stairs) outside the immediate Project limits.

Delivery of materials to site and trucking of debris from site.

Transportation of construction materials and debris through public areas (including corridors, lobbies and stairs) to and from immediate Project limits.

* + - * 1. Protections when using epoxy paints

The building will be occupied during construction.

Comply with the following requirements for Work involving the application of solvent-borne epoxy paints or high-build epoxy products:

Protect the work area where the epoxy paints are applied. Provide temporary barrier enclosures around the work area consisting of 8 mil polyethylene sheeting supported by wood or metal studs. The joints in the sheeting and the perimeter of the barriers must be sealed.

Provide temporary equipment to ensure that the work area is under negative pressure relative to the rest of the building.

Provide seven days' notice prior to the beginning of epoxy application. The Owner's Representative shall schedule a meeting to coordinate activities required to achieve the protection requirements indicated above and to determine whether air quality monitoring will be performed during epoxy application. Attendees at the meeting shall include the General Contractor, the Subcontractor for the epoxy application, the Owner's Representative and a representative of the University of Michigan's Occupational Safety and Health Department (OSEH).

* + - 1. SCHEDULING OF OPERATIONS
         1. Contractor must note that the building will be occupied at all times. Construction scheduling is of utmost importance. Refer to special conditions for 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.
         2. Date:

Contract demolition work is to begin see bid documents.

New elevator shall be operational and used by occupants by see bid documents.

Elevator shall not be out of service for more than 6 months and without interruption.

* + - 1. MAINTENANCE
         1. After completion of the installation, provide maintenance and 24-hour callback service for the equipment furnished under this section for a period of twelve (12) months as part of this Contract. This service shall also include regular examination (biweekly; equal to a minimum of (26) inspections in the one-year period. In the event the 26 site visitation are not completed within the year, 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 maintenance site visitation have been completed. Advise U. of M. elevator dept. 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 performance signed by the elevator shop after each visit.
         2. All maintenance 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.
         3. It is the responsibility of the U. of M. Elevator Department to respond to any emergency regarding elevators. In the event that someone is trapped in an elevator that is under contracted maintenance, during regular work hours Monday through Friday, 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 mechanics licensed by the State of Michigan only.
         4. A detailed record of work performed by University Elevator Mechanics is maintained in the Elevator Shop. Contractors shall contact U of M Elevator Shop for work performed by University Elevator Mechanics.
         5. 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 maintenance contract.
      2. RELATED WORK OF OTHER DIVISIONS
         1. 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.

Architectural work: See architectural drawings and specifications.

Electrical work: See electrical drawings and specifications.

Elevator contractor shall coordinate with all other trades working in hoistway and be available to operate the elevator in a "running platform" manner to allow other trades to complete their work.

Note: All telephone cable and conduit between machine room terminals and controller and car shall be provided by elevator contractor.

* + 1. OUTLINE OF new EQUIPMENT

spec Editor: Edit the following to suit project.

* + - * 1. Elevator Number: Existing State Number \_\_\_\_
        2. Type of Service: Passenger/ Service (Dormitory)
        3. Elevator Type: Overhead, traction, geared, machine located on \_\_\_floor (Room number \_\_\_\_\_\_\_)
        4. Quantity: one\_\_\_
        5. Capacity: 3000 pounds
        6. Speed: 250 FPM
        7. Travel: 53'-6" + or - (Field verify)
        8. Number of Stops: 4\_\_\_
        9. Number of Door Openings: 4\_\_\_
        10. Floors Served: 1,2,3,4
        11. Main Floor Egress: \_\_\_\_\_\_; Alternate Floor Egress: \_\_\_\_\_\_\_.
        12. Hoistway Size: \_\_\_\_\_long x \_\_\_\_\_wide (to edge of sill) - Approx. Existing; Field Verify
        13. Pit Dimensions: \_\_\_\_\_long x \_\_\_\_\_wide x \_\_\_\_\_deep (Field Verify)
        14. Platform Size: \_\_\_\_\_\_long x \_\_\_\_\_wide
        15. Car Interior Dimensions: \_\_\_\_\_\_long x \_\_\_\_\_\_wide x \_\_\_\_\_\_ high, (dimensions to match existing)
        16. Car Door Size/Operation: \_\_\_\_\_\_wide x \_\_\_\_\_\_high
        17. Door Opening Type: Single Speed, Center Opening (match landing size)
        18. Machine Type/Location: Geared/Overhead
        19. Control: Microprocessor Type, See 11.0
        20. Operation: Selective/Collective
        21. Power Supply: 208 Volts/ 3 Phase/ 60 Cycle; Motor Horsepower: 20
        22. Fire Fighter Service: Yes
        23. Independent Service Operation: Yes
        24. Load Bypass Operation: Yes
        25. Anti-nuisance Feature: Yes
        26. Special key Switches: Yes, (two key switches per floor, one for security on & off, one for momentary override).
        27. Additional Features

Hall position indicator at main floor and inside car, infra-red type door protection, special emergency service Phase I and Phase II, car ventilation blower, hoistway access package, protective pads and hooks, telephone and telephone cabinet (see 7.5), certificate frame, hand-rails, emergency car light. Car traveling lantern in each jamb.

Provisions for handicapped: raised markings for hoistway doorjambs, adjustable door open times.

Refer to "Elevator Guidelines to Ensure Accessibility by People with Disabilities" attached herewith for additional requirements.

* + 1. machine room PRODUCTS
       1. Electric Traction Elevator (Geared)
          1. Geared Machine:

The machine shall be of the single worm geared traction type with motor, brake, gearing and driving sheave mounted in proper alignment on a cast iron or structural steel bedplate.

The worm shall be of forged steel, integral with the worm shaft and provided with a ball bearing thrust designed to take the end thrust of the worm in both directions. Thrust shall be removable without dismantling machine or require the removal and re-installation of the brake pulley. The worm gear shall be hobbed from a bronze rim, which shall be accurately fitted and bolted to the gear spider.

The driving sheave shall be grooved for the proper number and size of hoist ropes and so designed as to maintain constant traction. The driving sheave shall be of the renewable traction sheave rim type.

The adjustable roller or anti-friction metal bearings shall include adequate means for lubrication.

* + - * 1. Motor: The motor shall be coupled to the worm shaft, and specifically designed for elevator service. Motor shall be one hour rated, class F insulation, premium, efficiency (--% minimum efficiency) and shall be suitable for variable speed operation.
        2. Brake: A double-shoe brake of the cushioned short-stroke adjustable type shall be provided. The brake shall be designed to stop and hold the car with 125% of the rated load per code requirements. The brake shall be designed so it is instantly and automatically applied in the event of power failure. An emergency break or rope break shall be provided as per A17.1-2000.
        3. 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.
        4. Isolation: The machine bedplate shall rest on isolation pads of proper density to effectively isolate the machine from the building structure.
        5. All exposed surfaces of machine, motor and governor shall be painted with rust-resisting gloss, gray color enamel after installation.
        6. Manufacturer: Hollister Whitney or Titan.
        7. Provide wrap-type fire retardant filter on the air intakes to the machine motor for protection of motor internal components.
      1. programmable Controllers for ac traction elevators:
         1. Controller Description:

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

The drive shall use a three-phase, full-wave bridge rectifier and capacitor bank to provide a bus for the solid-state inverter.

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.

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.

The drive shall not create excessive audible noise in the elevator machine motor.

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.

Drive input voltage waveform: Less than 3 percent THD.

Drive input current waveform: Less than 100 percent THD.

The University will measure reflected THD. The elevator contractor shall provide at no additional cost any additional devices required to meet the above THD limits.

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.

A means shall be provided for removing regenerated power from the drive's power supply during dynamic braking. This power shall be dissipated in a resistor bank, which is an integral part of the controller. Failure of the system to remove the regenerated power shall cause the drive's output to be removed from the hoist motor.

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.

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.

The controller shall provide stepless acceleration and deceleration and provide smooth operation at all speeds.

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.

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 within 12" (304.8mm) of 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.

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.

The appropriate landing system shall be used with this controller and shall be of steel tape type.

* + - * 1. Specifics For Closed Loop System:

Closed loop tachometer feedback control shall be provided. 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.

* + - * 1. Specifics For VVVF Drives (For speeds of 150fpm or below): (NOT APPLICABLE)

NOTE: For VVVF applications, the AC motor shall have slip specifications between 8 percent and 12 percent, or a NEMA rating of "D".

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).

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.

* + - * 1. 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".

The flux vector drive shall be capable of producing full torque at zero speed.

The flux vector drive shall not require DC injection braking in order to control the stopping of the car.

The flux vector drive shall utilize encoder feedback to regulate hoist motor speed. The encoder shall be mounted to the motor shaft.

* + - * 1. The controller shall be UL, ETL or CSA listed, and shall meet FCC part 15 subpart J limits for radio frequency interference.
        2. Fluorescent lighting shall be provided at the front and back inside the controller cabinet.
        3. Controller manufacturer shall be Motion Control Engineering (MCE) Model IMC-AC controls, closed loop with remote diagnostics and shall be compatible with the existing U of M system, or O. Thompson Micro-Flite Plus with drive and remote diagnostics. Drives shall be Magnetek, Toshiba, Elevator control Corp. or Baldor with applicable options.
        4. Elevator controller is to be equipped with provisions for emergency power connections.
    1. Auxiliary Operations
       1. Firefighter's Service:
          1. The following operation is for the use of firemen and other authorized personnel.

Automatic passenger elevators shall conform to the following:

A three position (on, off, and by-pass) key-operated switch shall be provided 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, all 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.

An elevator traveling away from the main floor shall reverse at the next available floor without opening its doors.

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.

Door reopening devices for power-operated doors, which are sensitive to smoke, heat or flame shall be rendered inoperative.

All car and corridor call buttons shall be rendered inoperative and all call registered lights and direction lanterns shall be extinguished and remain inoperative.

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.

A sensor in each elevator lobby, which when activated prevents cars from stopping at that floor, shall not be substituted for the above requirements.

Sensing Devices: In addition to the key-operated switch required in "1" above, heat and smoke or products of combustion sensing devices shall be furnished and installed in each elevator lobby at each floor, and the main floor (Note - Egress floor is 1st 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 "by-pass" 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, 120 vac, Gentex Corp. Model 8100. Submit drawings showing locations of smoke heads and exposed conduit for owner's approval prior to installation.

A three position (off-hold-on) key-operated switch shall be provided in each car 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 main 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.

The operation of elevators on Fire service shall be as follows:

An elevator shall be operable only by a person in the car.

Elevators shall not respond to elevator corridor calls.

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 reclose. Open doors shall be closed by continuous pressure on "Door Close" switch or button.

Means shall be provided to cancel registered car calls.

When the switch is in the 'hold' position, the car shall remain at the floor with its doors open.

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.

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.

Instructions of operation shall be provided as required by code.

* + - * 1. Elevators arranged for dual operation shall:

Conform to the automatic operation described above when on automatic operation.

When firefighter emergency operation is activated and the elevator is on independent or inspection operation the elevator shall be provided with a signal 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.

Alternate Floor Fire Service:

Alternate Floor Fire Service:

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).

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 second floor, which has been designated "alternate" fire service floor where the elevator doors shall open and remain open.

* + - 1. 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. A two-position switch shall be provided 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:

The car is disconnected from the group supervisory system.

Existing car calls shall be canceled.

The cars shall bypass landing calls.

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.

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.

Should all cars be put on independent service, all hall calls registered shall be canceled. Further registration of hall calls shall be inhibited.

* + - 1. Load Bypass Operation:
         1. Include operation to 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.
      2. special key switches:
         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.
      3. Anti-Nuisance Feature:
         1. Anti-nuisance operation shall be provided 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.
    1. Hoistway Equipment
       1. Provisions for Hoistway Access:
          1. Keyway - Furnish and install hoistway door unlocking devices at all landings (with removable plugs) 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 the access floors 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 men, and repair men.
          3. Access Switches - Furnish and install hoistway access switches and associated devices (at floors 1 and 4) 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. 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, and UP and DOWN Operating and safety operating Buttons. This device shall comply with ANSI A17.1-2000 and local codes. Using Adams model A-912CG with light guard or an approved equal.
          2. Operation from the top of the car shall not be permissible unless all electric door contacts are closed.
       3. Pit Stop Switch:
          1. A switch or switches shall be located in each elevator pit, in accordance with ANSI A17.1-2000 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.
       4. Landing Door HANGERS:
          1. Each hoistway door shall be suspended by two (2) sheave type hangers running on a hanger track provided integral with the hoistway entrance. 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, with MOH operator.
       5. hoistway doors and door operators:
          1. Provide new hoistway doors similar to new car doors, see item 6.8, including hardware and tracks.
          2. The 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.
          3. Manufacturer: GAL, with MOH operator.
       6. Strip Lighting:
          1. Strip lighting for full length of each hoistway shall be provided by others but all necessary arrangements to install same are to be covered by elevator contractor. Refer to electrical drawings and specifications.
       7. ELECTRIC WIRING:
          1. 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.
          2. All wiring shall have a flame retarding moisture resisting outer cover and shall be run in metal conduit, flexible metallic tubing, or wire ducts.
          3. 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.
          4. Terminal blocks shall be coded to identify the circuits. Multi-conductor cables shall have the conductor color coded and numbered.
          5. The elevator car shall be provided with a suitable receptacle fitted with a wire lamp guard on top of the car and a suitable GFCI duplex plug receptacle.
          6. Unless otherwise specified, control wiring shall be minimum size #18 AWG. Wire size shall be large enough so that the voltage drop under inrush conditions will not adversely affect operation of the controls.
          7. Electrical Receptacle in Car: Provide GFCI duplex electrical receptacle in car. Locate receptacle approximately 2" above finished floor below car station. Provide matching face plate on receptacle
          8. Phase Protection: Provide 3-phase power monitor for elevator power supply which monitors phase loss, low and high voltage, phase reversal, phase unbalance, and has both manual and automatic resets. Leave in manual position.
          9. Execution:

Install all power wiring in raceway systems. No exposed wiring or conduit shall be run in finished areas without prior written approval of owner.

Splice cables and wires only in outlet boxes, junction boxes or pull boxes. (Note - No wire splicing allowed in raceway or wire ducts).

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.

All terminal strip connections shall be identified with corresponding reference numbers from cable termination chart and electrical straight-line diagrams.

* + - 1. MACHINE FINISH AND PAINTING:
         1. All exposed surfaces of machines and motors, governors, controllers, etc., shall be repainted after field installation and before acceptance by Owner with rust resisting gloss enamel light gray color paint.
      2. EMERGENCY ALARM BELL:
         1. An alarm bell with it is own source of emergency power shall be provided and mounted on the car. When the emergency alarm bell button in the car is pressed, the alarm bell shall sound. Operation shall be in accordance with A17.1-2000 and the State of Michigan Elevator Code.
      3. HOISTING AND GOVERNOR ROPES:
         1. The elevator shall be provided with hoisting 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 poured-babbitted type sockets to fasten the ropes.
      4. COUNTERWEIGHTS:
         1. Elevator shall be suitably counter-balanced for smooth and economical operation by adjusting the quantity of existing and or new counterweight fillers. Contractor to check for frame integrity to insure no defects exist or shall replace. 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.
      5. GUIDE RAILS (REUSE on replacement projects where possiable):
         1. 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 gray paint.
      6. Buffers:
         1. Must be oil type buffer for speed over 200 fpm, buffers shall be in accordance with ANSI A17.1-2000 code. The buffers shall be fastened to steel channels provided and installed by the elevator contractor.
      7. 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.
      8. 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.
      9. Automatic Two-way 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.
      10. Sheaves:
          1. New deflector sheaves shall be provided 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. Existing steel channels at top of hoistway may be reused if engineering data supplied by Elevator Contractor supports their reuse and shall be paint stripped and repainted.
          2. 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.
      11. 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. 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.
          3. 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.
          4. Manufacturer: Landing control system shall be as manufactured by Interface Products, Co. model IP-8300 (including any required modifications to accept elevator control systems) or approved equal (under Owner's Options).
    1. Car Equipment:
       1. 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, MOH operator
       2. Door protection and reopening device:
          1. Manufacturer: Adams Gatekeeper 2000 or Janus 3D.
       3. Adaptive door timing:
          1. Door open times will be varied subject to the call situation causing the stop:

Shortest timing, when car call only causes stop.

Longer timing, when hall call only causes stop.

Longest timing, when coincident hall and car calls exist.

All timing shall meet ADA guidelines as a minimum.

* + - 1. 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. Manufacturer: Hollister-Whitney or Titan.
      2. 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" plywood plus 14 gauge steel plate plus 3/4"thick plywood plus finish flooring). Top finish flooring on cars shall be furnished and installed by elevator contractor and shall be as described in item 8.K.
         2. Each passenger type platform shall be equipped with an extruded aluminum threshold and a steel toe guard at the loading edge. The underside of the platform shall be fireproofed to comply with local codes.
         3. Car loading only shall be capable of C3.
      3. 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.
         2. Car roller guides (ELSCO type A): The elevator frame shall be provided with roller guides. Each roller guide 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.
      4. 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. Manufacturer: Elsco model "A" for car and model "B" for counterweight.
      5. car doors:
         1. Doors shall be 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 A17.1-2000 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.
    1. operating fixtures
       1. 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 Key Switch, 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. The control panel shall also contain separate key operated switches for inspection, independent service, car lights and car fan.
          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 nickel cadmium batteries.
          4. Manufacturer: PTL or Innovation Industries. All shall be vandal resistant.
          5. Refer to detail on drawings.
       2. 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. Fixtures shall have up and down buttons at intermediate floors and single buttons at top and bottom floors.
          3. 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).
          4. Provide engraved graphic emergency sign and illustration on all hall push button station plates: "IN CASE OF FIRE USE STAIRWAY FOR EXIT". "DO NOT USE ELEVATOR"
          5. Manufacturer: PTL Performer Series or Innovation Industries.
          6. Refer to detail on drawings.
       3. Handicap provisions: SEE PART 15.0
       4. Floor passing chime:
          1. Provide a floor-passing chime to meet ADA requirements.
          2. Manufacturer: PTL or Innovation industries.
       5. 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. Engrave faceplate with: "EMERGENCY PHONE - 911".
          2. Phone shall keep working during power failure. Coordinate work with U of M ICOM. 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. Manufacturer: Adams Lifeline A930P5T (call track), with hand free operation or equivalent.
          4. Refer to detail on drawings.
       6. Car traveling lantern:
          1. Shall be provided on both sides of car doorjambs and shall be ADA compliant.
          2. Manufacturer: PTL or Innovation Industries.
          3. Refer to detail on drawings.
       7. Car fire alarm horn: (omitted)
       8. car position indicator:
          1. A LED (Light Emitting Diode) vandal resistant digital type position indicator shall be provided inside car, above door. 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.
          3. Refer to detail on drawings.
    2. elevator enclosures
       - 1. All cab material; design, lighting, ventilation and exits shall comply with "American National Standard Safety Code for Elevators, ANSI A17.1-2000" and/or local codes. Where codes conflict the more stringent shall apply.
         2. Wall panels and reveals shall be of rigidized 316 stainless steel construction and applied to a steel shell. Applied panels shall be by G&R elevator Co. or other approved.
         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 coved lighting of 20 foot candle in cab. Coves shall be made of stainless steel with #4 finish and located at ceiling level with florescent lights (two 3 ft., warm, white, deluxe lamps in each cove) on both sides of cab. Also comply with UFAS lighting level requirements. Provide stainless steel protective guards consisting of two mesh, 14 gauge, wire cloth encased in a U-channel frame and of adequate size for maintenance. These guards shall be secured in place with tamper proof screws. Submit shop drawings prior to fabrication for Owner's approval. See Sketch at end of this section for detail.
         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. Doors shall be of hollow metal construction, suitably reinforced and sound deadened. Interior shall be stainless steel with #4 finish and equipped with NYLUBE door guides.
         9. 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.
         10. A 3/8" x 2" bar handrail with radiused ends of #4 brushed stainless steel finish shall be provided to meet code requirements.
         11. Car sills shall be extruded aluminum. Car sills for elevator in parking structures shall be nickel silver.
         12. Finished floor covering shall be furnished and installed by the elevator contractor. The type shall be "Endura" style with base and color to be light gray.
         13. Telephone - SEE PART 7.5
         14. Cab manufacturers:

G&R Elevator Co.

Haunstein Burmeister

Tyler

Brice Southern

Columbia

* + 1. hoistway entrances
       1. Entrances:
          1. New entrances shall consist of flush hollow metal door panels, bolted unit type frames, sills, integral hanger(s), hanger covers, fascia plates, headers, struts, sight guards, and hardware.
       2. 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 form 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.
       3. Hoistway Doors:
          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 A17.1-2000 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. Doors interior shall be painted black.
          3. Doors exterior finish shall be polished stainless steel.
       4. 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.
       5. Struts:
          1. Steel angle struts [3" x 3" x 1/4"] shall extend from the sill to the building beam above and shall be securely fastened to ensure rigidity and adequate support for the header.
       6. Headers:
          1. Header shall be constructed of 3/16" formed steel to provide support for the frame and hangers.
       7. Facia, covers, and toe guards:
          1. Facia, including hanger covers, toe guards and dust covers shall be fabricated of No. 16 U.S. gauge steel. Facia shall span the width of the opening plus 6 inches. Dust cover shall extend 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 a 60 deg. angle.
          2. Finish:

Struts, headers, hanger covers, 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.

All existing heads and jambs shall be stripped to bare metal, prepared with primer and finished with two coats of enamel paint.

* + - 1. Hall position indicator:
         1. Provide indicator at each floor, in respective elevator lobby or hallway, above hoistway door. Description shall be as in PART 7.8 or cap part of the hallway buttons and shall be digital in red color (LED type).
    1. accessories
       1. Car and/or hall operating key switches: SEE article 4.4
    2. Elevator commissioning: by u of m elevator shop. SEE article 14.3.
    3. shop drawings and sample submittals
       1. SAMPLES:
          1. Submit samples of car interior wall, car floor tile and enamel colors. Do not proceed with the orders until samples are approved by engineer.
       2. 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.
       3. PRODUCT DATA:
          1. 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.
       4. CERTIFICATES:
          1. Furnish without cost to the Owner all certificates necessary as evidence that the elevator conforms with the applicable codes, laws, ordinances, and requirements.
    4. performance
       1. Contract speed:
          1. Actual speed shall vary no more than +/- 5% from speed specified under any loading condition or direction of travel.
       2. Leveling accuracy:
          1. Consistently level within +/- 1/4" under loading conditions.
       3. Door times:
          1. The door opening time, measured from the instant the doors start to open until within 1" of the fully open position, shall not exceed Code standards
          2. Long door and short door "hold open" times, shall be set at 4.0 and 2.5 seconds respectively and shall be ADA compliant.
    5. Execution
       1. site inspection
          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 affect the execution of the work.
          2. No exposed wiring or conduit shall be run in finished areas without prior written approval of owner.
       2. cleanup
          1. Keep work areas orderly and free of debris on a daily basis.
          2. Remove filings and loose materials resulting from this work from hoistways.
          3. Clean all dirt, oil and grease from machine room and pit equipment and floors.
          4. Clean car, car enclosures, entrances, hoistways, operating and signal fixtures and trim of dirt, oil, grease, and finger marks.
          5. Polish shine all stainless steel components.
          6. Clean all guide rails.
       3. acceptance demonstration and performance test (commissioning):
          1. Demonstrate to Owner, or Owner's designated representative, the operation of the elevator system. Demonstration shall include:

Installation compliance with specifications.

Contract speed, capacity, and floor-to-floor performance compliance with specifications.

Stopping accuracy and car ride compliance with specifications.

Operation of signal fixtures and operation of supervisory or dispatching system.

Promptly remove all work rejected by the Engineer for failure to meet specifications and replace 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.

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.

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 1.6 of this division

* + - * 1. Operating Instructions: Provide instructions to the Owner's personnel, including safety procedures, proper operation of the equipment, and routine maintenance procedures.
      1. performance guarantee
         1. 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.
      2. final submittals
         1. Provide four complete sets (bound and properly arranged) of the parts lists and operators manuals prior to receiving final payment. Following is a brief summary of items:
         2. Legible schematic wiring diagrams including all changes made during installation.
         3. Description of operation of elevator system installed.
         4. Hoisting machine: Including Motor, Brake, Geared Machine and associated devices such as Tach Motors or Monitors.
         5. Deflector Sheaves, Governor and Governor Tail Sheaves, Safeties, Buffers.
         6. Counterweight Assembly, Guide Rollers on Counterweight and Car, Cable Shackles. Safties and rops brake or other approved emergency stopping device.
         7. Controller and Selector: Including parts information on Relays, Printed Circuit Boards, Reverse Phase Relays, Switches, Lamps, Electrical Cables, Monitors, Modems, Diagnostic Hardware, Diagnostic Software, Overload Protection Devices.
         8. 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.
         9. Signal Equipment: Including Car Station, Hall Stations, Position Indicators, Direction Indicators, Fire Service Panel, Smoke Detectors, Key switches, And Pushbutton Assemblies.
         10. SCR Drive Units, Transformers, Chokes.
         11. Car Top Inspection Station, Limit Switches, Solid State Leveling Control Units, Leveling Switches, Alarm Bell.
         12. Lap top computer with related programming for elevators monitoring, minimum of 250 MHZ.
      3. technical training
         1. Onsite technical training shall be held for the purpose of familiarizing University of Michigan 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. Submit details of training cost with bid.
    1. 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 elevators (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,
    2. acceptable products
       - 1. Fixtures (Car Operating Panel, Hall Push Button): PTL Vandal Resistant or Vandal Resistant Innovation Industries.
         2. CONTROLLER: Motion Control Engineering Model VVV for flux vector and remote diagnostics or O. Thompson Micro-Flite Plus or Elevator Controls Corp. shall be IBM compatible remote diagnostics.
         3. DOOR OPERATOR & EQUIPMENT: GAL Manufacturing Corp. MOH Operator, car and hall door tracks, car and door hangers with roller assemblies. All interlocks, pickup rollers and operating linkage manufactured by GAL.
         4. HOIST MACHINE: Manufacturer's standard that complies with all duty requirements of this Section and manufactured by Hollister Whitney or Titan.
         5. SPEED DRIVES: Baldor with all applicable options, or as approved by controller manufacturer.
         6. DOOR PROTECTIVE DEVICE: ICU/Gatekeeper 2000 from Adams Elevator Equipment Company or Janus 3D.
         7. TELEPHONE: Adams - Lifeline Model A-930P5T, integral of cabinet. See 7.5
         8. ROLLER GUIDES: Elsco Model "A" on car and Model "B" on counterweights.
         9. CAR TOP INSPECTION STATION: Adams Model A-912CG or other approved.
         10. FLOOR ANNOUNCEMENT SYSTEM: Shall be through chime signal, by Adams or the controller and shall be approved by engineer.
         11. CAB MANUFACTURERS:

G & R Elevator Mfg.

Haunstein Burmeister

Tyler

Brice Southern

Columbia

End of Section