D10 Conveying Systems

D1010 Elevators and Lifts

1.1. GENERAL

.1 All equipment installed shall conform to the latest edition of the CSA B44 Safety Code for Elevators, the Alberta Building Code and the requirements of the Alberta Safety Codes Act and Elevator Regulations.

.2 In general it is the intent of these guidelines and standards to establish the framework and set minimum standards for the provision of elevator equipment for buildings at the University of Alberta. In general the goal is to obtain high quality, efficient elevator equipment suitable for long term operation and use in the building. Elevator equipment shall have durable, and easily maintained finishes, fixtures and components.

.3 Provide standardized equipment where required to meet the University's requirements.

.4 Where the location and use of the equipment is unsupervised or unprotected equipment shall be of an especially rugged and vandal resistant design to withstand the rigours of this type of operating environment.

.5 Where stated herein the minimum requirements of the governing codes and regulations shall be exceeded in the areas of fire and life safety, accessibility, passenger safety and workplace safety.

.6 Upon completion of any project a full complement of submissions including manuals, wiring diagrams, archive software, special tools, etc. shall be provided to the University for the equipment.

.7 Provide systems that meet the highest level of accessibility. Comply with the University “Universal Design Guide.”

.8 Install elevators in buildings two stories and higher. The design shall provide direct service to all floors in the building including floors where mechanical rooms are located.

.9 In order to ensure specification and installation compliance with the standards, retain the services of an elevator consulting firm to provide design, specification, and construction/inspection services.

.10 In the case of an elevator upgrade or remodeling project, the University shall retain the salvage rights to the existing elevator components.

.11 The provision of manufactured standard proprietary control equipment that requires adjustment or trouble shooting with proprietary diagnostic instruments shall be strictly PROHIBITED.
1.2. QUALIFICATIONS

.1 Elevator Contractor to have minimum 5 years past successful experience in supply and installation of new elevators and in complete maintenance of elevators.

.2 Elevator Subcontractor must employ competent personnel to handle this service, maintain locally an adequate stock of parts for replacement or emergency purposes; and have qualified mechanics available to ensure fulfillment of maintenance service and respond to emergency call-back 24 hours per day, every day of the year.

1.3. MANUFACTURED EQUIPMENT

.1 The following elevator contractors are approved for use on University projects:

   .1 KONE Elevator Co. Limited Telephone: (780) 452-9227
   .2 Otis Canada Inc. Telephone: (780) 444-2900
   .3 Schindler Elevator Corporation Telephone: (780) 425-1043
   .4 ThyssenKrupp Elevator Co. Telephone: (780) 488-0976

1.4. STANDARDS FOR PASSENGER ELEVATORS

.1 Type of Elevator:

   .1 For buildings with 2 or 3 elevator stops with a total travel of less than 9 m, and if the traffic demand will be light, use hydraulic elevator equipment.
   .2 For buildings with 4 to 12 elevator stops, use electric geared traction elevator equipment.
   .3 For buildings exceeding 12 elevator stops, generally use gearless traction elevators, with machine located overhead.
   .4 Where the choice could be made for either hydraulic or traction. The preference should be for traction elevators where the traffic will be heavy, or where the total number of elevators is less than the theoretical requirements of the elevator consultant’s recommendations. Likewise where the design requires a maximum of output from each elevator the choice should be for traction elevators.
   .5 Lifts for persons with disabilities, handicapped lifts or wheelchair platform lifts shall not be acceptable as passenger elevators.
   .6 Limited Use Limited Application (LULA) elevators shall be acceptable to provide an accessible path of travel where a full passenger elevator is not required and if pre-approved for use on a project by the University.
.2 Size of Elevators:

.1 Passenger elevators shall have a minimum capacity of 1135 kg for basic single unit applications unless building requirements mandate a larger platform size. Larger buildings with more than one elevator shall typically use 1360 kg to 1820 kg platform sizes based on the demand and other building requirements. Elevator sizes shall be chosen from typical North American manufacturer’s standard sizes unless the needs of the building dictate the use of non-standard sizes.

.2 Passenger Elevator cabs shall have a cab height of not less than 2745 mm and a clear height beneath the suspended ceiling or not less than 2590 mm.

.3 Location of Elevators:

.1 Elevators should be located centrally in the building or where the walking distance to any point on the floor plate does not exceed a maximum of 45 m. Where the location of the elevator(s) exceeds 45 m from any point in the building then separate elevator service should be provided in distributed segments of the building where the walking distance from any point in the building to the elevator(s) does not exceed 45 m.

.4 Number of Elevators:

.1 The number of elevators provided for any building shall be determined by the specialist elevator consultant via a theoretical elevatoring traffic analysis based on recognized elevatoring principles and the expected use, population and occupancy for the building. As a rough guide the number of elevators provided for a building shall not be less than the following:

.1 For buildings with 3 or less elevator stops, and a gross area of less than 5,000 m², provide a single elevator.

.2 For buildings with 4 or more elevator stops, use traction type elevators. If the gross area exceeds approximately 6000 m² provide a group of two elevators. If the gross area of the building exceeds 10,000 m² provide a group of three elevators.

.2 If distributed elevator configurations are used then the total number of elevators required shall be increased by approximately 60% to account for the inefficiencies of the distributed arrangement and imbalances in demand.

.5 Speed of Elevator:

.1 The speed of the elevator shall be within the following ranges and chosen to suit the specific building requirements as part of the elevatoring traffic analysis:
1. Hydraulic passenger elevators
   0.5 to 0.75 m/s.

2. Geared traction passenger elevators
   1.0 to 2.0 m/s.

3. Gearless elevators
   2.5 m/s and greater

6. Door Type and Size:
   1. For passenger elevators, the preferred door is Centre Opening, with a minimum door width and height of 1067 mm x 2134 mm.
   2. Where traffic demand is expected to be light, and required by code the elevator designated to accommodate a mobile stretcher as required by the building code can have a single speed side opening door, 1067 in clear opening width.
   3. Where there is already an elevator which satisfies the mobile stretcher requirement the remaining passenger elevator(s) in the building should be provided with centre opening doors for efficiency.
   4. Front and rear door arrangements should be avoided, and used only where the design of the building makes any other solution impossible.
   5. Elevators with side entrances are not acceptable.

1.5. STANDARDS FOR FREIGHT ELEVATORS AND SERVICE ELEVATORS

1. Type of Elevator:
   1. Elevators required specifically for freight and freight handlers only shall be designated as true freight elevators. Where a combination of freight and passenger use is required the elevator shall be designated as a passenger elevator but shall be designed with the freight use in mind to provide a service type elevator.
   2. For light use applications with 4 stops or less and a maximum rise of 14 m the use of hydraulic equipment shall be acceptable.
   3. For heavier use applications or when the number of stops and rise exceeds 4 and 14 m respectively then traction elevator equipment shall be utilized.

2. Class of Loading:
   1. Provide Class C3 loading where single piece or large concentrated loads must be moved which will exceed 25% of the rated capacity of the elevator (but will not exceed the rated capacity of the elevator).
   2. Provide Class C1 or C2 loading as appropriate where the elevator is required to be loaded or unloaded by an industrial truck.
.3 The use of freight platform lifts or material lifts as defined in the B44 Safety Code for Elevators shall not be acceptable unless very special conditions exist to justify these restricted use configurations.

.3 Location of Elevators:

.1 Locate freight and/or service elevators adjacent to service entrances, corridors and loading docks as applicable.

.4 Number of Elevators:

.1 Where a freight or service elevator is required, generally one (1) will be adequate except where known demand is higher and may require more.

.5 Size of Elevators:

.1 Freight and Service elevators shall be sized to suit the largest object which has to be moved and the capacity rating shall be appropriate for the anticipated needs. Elevator sizes shall be chosen from typical North American manufacturer's standard sizes unless the needs of the building dictate the use of non-standard sizes.

.2 Service Elevator cabs shall have a clear cab height of not less than 3050 mm beneath the exposed cab ceiling.

.6 Speed of Elevator:

.1 The speed of the elevator shall be within the following ranges and chosen to suit the specific building requirements; Service elevators shall be treated as passenger elevators for determination of speed and other criteria.

  .1 Hydraulic freight elevators 0.3 to 0.5 m/s.
  .2 Geared traction freight elevator up to 2000 Kg 1.0 to 1.75 m/s
  .3 Geared traction freight elevator > 2000 kg 0.75 to 1.0 m/s.

.7 Type of Doors, Operation:

.1 For Service (Passenger) elevators provide power operated horizontally sliding passenger doors. The use of two (2) speed side opening or two (2) speed centre opening doors may be utilized to provide a wider opening to suit the anticipated needs. The use of three (3) speed doors or other special arrangements such as swing doors is not acceptable unless very special conditions exist to justify these more unusual arrangements.

.2 Vertical sliding or bi-parting doors shall only be used on true freight elevators where no passenger use is required and where a maximum of opening width is required. Vertical sliding or bi-parting doors exceeding 2440 in width shall be power operated. Vertical sliding or bi-parting doors
2440 or less in width may be manually operated unless specific site or building requirements require power operation. The need for power operated doors shall be determined by the design team in consultation with the University’s Project Manager at the early stages of any project involving freight elevators.

.8 Size of Doors:

.1 Standard door width for horizontally sliding Service (Passenger) elevator doors is 1070 mm, although larger sizes are available. Where possible doors shall be chosen from sizes in 150 mm increments. A standard door height of 2135 mm should be used unless higher doors are required in which case 2440 mm high doors should be chosen.

.2 The minimum width for vertical sliding or bi-parting doors should be 1830 mm and larger doors shall be chosen from 610 mm increments where possible to stay within typical standards.

1.6. HYDRAULIC ELEVATORS

.1 Dual jack, holeless hydraulic elevators are preferred for two stop applications to eliminate the need for a cylinder hole and buried hydraulic cylinders.

.2 For applications with 3 or more stops generally provide single piston direct acting hydraulic elevators unless soil or other considerations preclude drilling of a suitable cylinder well hole.

.3 Where drilling is prohibitive or other factors make a conventional hydraulic elevator impractical a “holeless” or “roped” hydraulic type may be considered with the approval of the University’s Project Manager. Roped hydraulic elevators, and telescopic hydraulic elevators should not be considered other than in very special cases.

.4 Machine rooms for hydraulic elevators shall be located adjacent to the hoistway at the lowest landing. If necessary machine rooms may be located remotely within 20 m of the elevator hoistway upon approval of the University’s Project Manager.

1.7. ELECTRIC GEARED OR GEARLESS TRACTION ELEVATORS

.1 Machines shall be mounted on a structural machine room floor slab designed to support the reactions from the equipment without the need for machine beams. Provide a detailed layout and/or template for the machine room floor slab prior to construction with precise locations for the passage of ropes, conduit and other components. Openings in the machine room floor shall be kept to a minimum and shall be limited to the passage of ropes and electrical wiring and conduit.

.2 Provide a machine of the geared or gearless traction type to suit the application with motor, brake, traction drive sheave and deflector sheave compactly mounted on a continuous bedplate and set on steel beams. Sound isolation pads shall be installed beneath the machine bedplate to
reduce vibration and noise transmission to the building structure.

.3 The machine and all deflector sheaves shall be mounted completely above the machine room floor slab and shall be sound isolated from the building structure. Sheaves shall be installed with a high degree of alignment to prevent or minimize rope and sheave noise and vibration.

.4 The machine room shall be located directly overhead unless height restrictions preclude a rooftop machine room, in which case, geared machines may be located at some other floor, generally at the lowest landing, adjacent to the hoistway.

1.8. PRODUCTS/FEATURES FOR ALL ELEVATORS

.1 Car Enclosure and Finishes:

.1 Elevator Finishes shall be selected from the following; Variations to the finishes provided shall be approved by the University of Alberta Project Manager.

<table>
<thead>
<tr>
<th>Component(s)</th>
<th>Passenger Elevators</th>
<th>Service Elevators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landing Door Panels and Entrance Frames – Typical Floor</td>
<td>Plain white prime coat paint finish</td>
<td></td>
</tr>
<tr>
<td>Landing Door Panels and Entrance Frames – Main Lobby Level(s)</td>
<td>Stainless Steel #4 Brushed Finish</td>
<td></td>
</tr>
<tr>
<td>Cab Door Panels, Cab Front and/or Rear Return Panels, Door Jambs and Header/Lintel</td>
<td>Rigidized Stainless Steel (Rigidized Metals Corp. or equivalent) pattern as selected and approved by University</td>
<td></td>
</tr>
<tr>
<td>Cab Ceiling</td>
<td>14 gauge furniture steel factory baked enamel finish, colour to be White as selected by the University.</td>
<td></td>
</tr>
<tr>
<td>Suspended Ceiling/Lighting Coves</td>
<td>Aluminum T-Bar with Aluminum Eggcrate Diffusers</td>
<td>Two (2) Light Coves on the cab side walls with factory baked enamel finish, colour to be selected by the University.</td>
</tr>
<tr>
<td>Cab Lighting</td>
<td>Energy efficient fluorescent lighting, consisting of T835 lamps and electronic ballasts.</td>
<td></td>
</tr>
<tr>
<td>Cab Walls</td>
<td>Raised, Vertical, Removable Plastic Laminated Panels. Plastic laminate or Stainless Steel panel reveals, all as selected by University</td>
<td>Raised, Vertical, Removable Rigidized Stainless Steel Panels (Rigidized Metals Corp. or equivalent) pattern as selected and approved by the University</td>
</tr>
<tr>
<td>Cab Finished Flooring</td>
<td>Resilient Sheet Vinyl or Linoleum type flooring provided by other trades</td>
<td></td>
</tr>
<tr>
<td>Cab Handrails</td>
<td>Standard 1 1/2” tubular stainless steel handrails on all non-access walls.</td>
<td>4” High Flat Bar stainless steel on all non-access walls.</td>
</tr>
<tr>
<td>Cab Kickplate/Baseplate</td>
<td>Stainless Steel #4 Brushed Finish</td>
<td></td>
</tr>
<tr>
<td>Car Door Sill/Threshold</td>
<td>Extruded Aluminum</td>
<td></td>
</tr>
</tbody>
</table>

.2 Where glass is used in or as cab enclosures it must be laminated safety glass.
.3 Provide one (1) set of protective cab pads and pad hooks in at least one elevator for each building.

.4 Freight Elevators shall be equipped with steel checkerplate floors and painted metal cab and entrance finishes. Cab finishes including cab walls, doors or gates, ceiling, etc. shall be finished in a factory applied powder coat or baked enamel finish. Entrance components including frames, headers and landing door panels shall be finished in a factory applied prime coat finish suitable for finished painting by others. Lighting for freight elevators to consist of recessed fluorescent light fixtures.

.5 Freight Elevators shall be equipped with two (2) 50 x 300 mm oak bumpers on rear and side cab walls.

.2 Entrances:

.1 Passenger and service elevators shall be equipped with 1½ hour fire treated, B label entrances.

.2 Freight Doors: Vertical bi-parting doors with 1½ hour fire label.

.3 Rails:

.1 Standard size “T” section car and counterweight guide rails, with tongue and groove joints, together with suitable splice plates at the connections are required.

.4 Car Top Guard Rail:

.1 Provide a substantial metal guard rail on the sides and back of the car top. The guard shall consist of a top rail located approximately 42” above the car top and an intermediate rail located approximately 22” above the car top. A 4” toeboard shall be provided at the base of the guard. The guard rails must be designed and installed to withstand a load of 550 N (125 lb.) applied perpendicular to the span in a horizontal at any point on the top rail and a vertical downward load of 1.5 kN per meter (100 lb. per foot) along the top rail. The horizontal and vertical loads need not be considered to act simultaneously.

.5 Allowance for Additional Weight:

.1 The complete elevator including the drive, support and counterweight shall be designed such that the weight of the basic cab can be increased with additional finishes or other additional equipment totalling not more than 350 Kg per cab.

.6 Guides:

.1 Provide roller guides consisting of polyurethane tired wheels, at least 150mm diameter for the car guides and 75mm diameter for counterweight guides where applicable for all passenger elevators.
.2 Guides on freight elevators shall consist of solid slippers or sliding guide shoes.

.7 Travelling Cable:
.1 Provide spare conductors in the travelling cables and communication wiring as follows; Provide spare wiring consisting of the greater of a minimum of 10% or ten (10) individual conductors and provide a minimum of eight (8) twisted shielded pairs of 20 AWG communication conductors for other equipment which may be provided, over and above any pairs required by the elevator control system.

.8 Voice Communications:
.1 For each elevator provide a vandal resistant, hands free, barrier free emergency voice communication system and mount as a separate fixture or as an integral part of the car operating panel. Hinged telephone cabinets are not acceptable. Emergency Telephone product to be Talk-a-Phone ETP-103 or approved equivalent. Provide a separate telephone activation button. Interface with the University wide telephone system.

.9 Door Operators:
.1 Automatic car door operators shall be of the heavy duty, high performance type designed for high performance and long life. Light or medium duty door operators are not acceptable.
.2 For groups of elevators of three (3) or more cars or for elevators serving more than 12 stops provide closed loop feedback operators capable of adjusting the closing torque to suit changing building conditions.
.3 Where front and rear doors are used provide full selective control of the door operation.

.10 Door Protection:
.1 Door re-opening devices shall be of the multi-beam infrared light detector type designed to detect obstructions without contact.

.11 Fixtures - General:
.1 All hall and car operating and signal fixtures shall be vandal resistant, illuminated fixtures.
.2 Provide stainless steel fixture faceplates for all car and hall operating and signal fixtures.
.3 Illuminate all car and hall operating and signal fixtures with LED lamps.
.4 Provide tamper-proof fasteners for all car and hall operating and signal fixtures.

.12 Car Operating Panel:
Where centre opening doors are provided the elevator cab shall have two car operating panels, one on each side of the cab. Where front and rear doors are used the elevator cab shall have two car operating panels, one on the front side and one on the rear side of the cab. Where space permits car operating panels shall be mounted on the door return panels, otherwise on the side walls adjacent to the door return panel.

In-Car stop switches shall be key operated. Where possible mount the car call buttons in a single vertical column.

Car Operating panel with bank of buttons numbered to correspond to landings served, emergency call button, run/stop keyed switch, door open button, door close button, telephone activation button. Connect emergency call button to bell that serves as emergency signal.

Lockable Service Cabinet to be provided containing the following: Fan, Light and Independent Service toggle switches, Emergency Light Test switch or button (not keyed), Inspection Keyed Switch, 110 volt power outlet. Lock for service cabinet to be provided by the University for installation by the Elevator Contractor.

Any elevator equipped with Phase I Emergency Recall shall also be equipped with Phase II In-Car Emergency Service Operation and the related keyed switch.

Buttons shall be of the vandal resistant type from the manufacturers standard range or those from Vendors as selected by the University. Provide sample buttons and other descriptive materials to permit selection of an appropriate button. Allow for the use of Dupar US91 target style buttons if selected by the Owner.

The panel faceplate shall be professionally engraved to identify each component, the position of switches, the elevator capacity, the Owner’s identification number as well as any jurisdictional identification numbers applicable to the installation.

Keying:

Keying to be in accordance with the following University standard requirements:

<table>
<thead>
<tr>
<th>Function</th>
<th>Keying or Type of Device</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service Cabinet Lock</td>
<td>To be Provided by University to Suit building Keying System</td>
</tr>
<tr>
<td>Light, Fan, Independent Service</td>
<td>Toggle Switch in Locked Cabinet</td>
</tr>
<tr>
<td>Emergency Light Test</td>
<td>Button or Switch in Locked Cabinet</td>
</tr>
<tr>
<td>Inspection, Run/Stop, Hoistway Access</td>
<td>Dupar X4002 keying</td>
</tr>
<tr>
<td>Emergency Recall, In-Car Emergency Service,</td>
<td>Dupar X4003 keying</td>
</tr>
<tr>
<td>Emergency Power Selection</td>
<td></td>
</tr>
</tbody>
</table>
.14 Hall Buttons:

.1 Terminal landings fixtures to contain single push button, intermediate landings fixtures contain “up” and “down” push buttons. Provide one fixture located between each pair of hoistway entrance doors; at single hoistway entrance locate as approved by University.

.2 Buttons shall be of the vandal resistant type from the manufacturers standard range or those from Vendors as selected by the University. Provide sample buttons and other descriptive materials to permit selection of an appropriate button. Allow for the use of Dupar US91 target style buttons if selected by the University.

.15 Hall Lanterns:

.1 Where there are two or more elevators in a group, there shall be hall lanterns at all entrances.

.2 Lanterns shall be of the vandal resistant type and shall be located above or adjacent to the entrance.

.16 In-Car Lanterns:

.1 Where a single elevator is being provided, it shall have an in-car direction lantern on each car door post. Where there are front and back entrances, there shall be pairs of lanterns on each entrance.

.17 Position Indicators:

.1 In addition to the car position indicator required for Barrier Free Access each elevator shall be provided with a digital position indicator over the main floor entrance. Position indicators shall be LED or Vacuum Fluorescent type dot matrix or digital segment displays with characters at least 35mm high.

.18 Cab Ventilation:

.1 Provide a two-speed exhaust mounted on the car top. Fans shall be of a rugged, quiet design with a maximum noise level of 60 Dba when on high speed.

.19 Emergency Cab Light:

.1 A battery powered emergency cab light device shall be provided for each elevator. The illumination source shall be an integral part of the car operating panel or as a separate inconspicuous fixture.

.20 Group Operation:

.1 Where two or more elevators are operating in a group, the operation shall be a group supervisory system, providing automatic collective control for each elevator and a group dispatching and hall call allocation system.
.21 Car Performance:

.1 The individual performance of like elevators shall be the same. Each elevator shall be adjusted for optimum performance.

.22 Controllers:

.1 Solid state, microprocessor type, factory tested, site programmable, enclosed in steel cabinet, system capable of fully monitoring all aspects of elevator use and operation and accommodating traffic requirements as they occur, including car velocity, position, waiting time, direction of travel, car assignment and total system performance. Provide Non-Proprietary diagnostics.

.2 Specialized diagnostic devices used to check operation of the microprocessor or required to fully adjust, troubleshoot and maintain the equipment that are not permanently attached to the controller shall be provided as part of the contract, and shall become the property of the University along with appropriate instructional manuals and documents.

.23 Card Reader Security System Interface Provisions:

.1 All elevator controllers shall be provided with a specially wired interface and terminal strip so that an external card reader system can be interfaced to the elevator system. The interface shall include a pair of terminals to suit dry contacts for each car call button such that the external card reader system can enable or disable the registration of the respective car call on an individual floor selective basis. A closed contact at the terminals shall permit the call to be registered whereas an open contact at the terminals shall prevent the call from being registered. The elevator controls shall be arranged so that an elevator operating on in-car emergency service shall override this security feature.

.24 Hall Tactile Markings:

.1 Provide quality embossed metal jamb plate markings. Provide EJ4 markings with four hole mechanical mounting available from Stencil Cutting and Supply Company, Ph. 1-800-783-4633 or approved equivalent product. Do not use plastic or etched plates, and do not use only adhesive for attaching.

.25 Independent Service Operation:

.1 Provide independent service operation on each elevator. This will be initiated by a switch located behind a locked cabinet in the car.

.26 Inspection Operation:

.1 Each car shall be equipped with an inspection switch to remove the car from service and prevent operation from any means other than the inspection operation manual controls.
.27 Hoistway Access Operation:
   .1 A hoistway access keyed switch and operation shall be provided for each elevator for access to the elevator car top regardless of the floor to floor height, car speed or other parameters.

.28 Emergency Recall Operation (Phase I):
   .1 Automatic emergency recall operation as initiated by the building fire alarm system shall be provided for all elevators in all buildings regardless of whether the building is considered a "high" building or not, as defined by the building code. Recall operation where provided voluntarily shall conform to the applicable Safety Code requirements.

.29 Emergency In-Car Operation (Phase II):
   .1 Provide in-car emergency service operation in all elevators.

.30 Emergency Power Operation:
   .1 Provide emergency power operation of each elevator regardless of building height. Operation of elevators may be limited to one elevator at a time provided all elevators can be returned to the ground floor level in the time period required by the building code. Emergency power mode of operation, to be initiated automatically upon transfer to emergency power to return each car at normal speed to main floor. One (1) site programmable pre-selected car to remain in service on emergency power. Provide an emergency power selection switch operated by a key to manually override automatic selection and indicator lights as required by the safety code.

.31 Emergency Power Operation – Pre-Transfer Operation:
   .1 When emergency power operation is provided include, as part of the control system, suitable circuitry to shut down a moving car at the next possible floor when an emergency power pre-transfer or advanced warning contact opens. The pre-transfer contact will be supplied by the others and will open approximately 20 – 30 seconds prior to the activation of the emergency power transfer switch.

.32 Additional Requirements for High Buildings:
   .1 The following features and/or equipment shall be provided when the building is classified as a "high" building as defined by the Building Code:
      .1 A minimum of one elevator shall be designated as a Firefighter's Elevator and shall be provided with the appropriate signage and all other features required to meet that designation.
      .2 Duplicate emergency recall switches and indications shall be provided for each elevator or group of elevators at the Central
The elevator emergency telephone system shall be compatible with and connected to a phone at the Central Alarm and Control facility (CACF).

1.9. PRODUCTS/FEATURES FOR HYDRAULIC ELEVATORS

.1 Tank Heater:
   .1 A thermostatically controlled tank heater to maintain the oil at a constant minimum operating temperature is required. Alternatively a viscosity control feature is also acceptable.

.2 Oil Level Indicator:
   .1 An outside oil level indicator is required to determine the oil level without removing the reservoir cover.

.3 Gate Valves:
   .1 A tank shut-off valve or gate valve is required in both the machine room and the pit.

.4 Electronic Motor Soft Start:
   .1 An electronic motor soft-start device is required and must be fully adjustable to limit the peak starting current to as little as 150% of the full load running current.

.5 Duty Rating:
   .1 All hydraulic elevator components including motor, pump, valve, piping and muffler shall be designed for a minimum duty of 80 up starts per hour and shall be capable of dissipating heat generated during periods of high use.

1.10. PRODUCTS/FEATURES FOR TRACTION ELEVATORS

.1 Sound Isolation:
   .1 Traction machines must be mounted on sound isolating pads, isolated in all directions.

   .2 Cab platforms shall be of the sound isolated type mounted on pads and isolated from the car sling and supporting structure.

.2 Motor and Variable Speed Drive:
   .1 Provide high efficiency AC motors with matching variable frequency/variable voltage drive system of the flux vector type. Control
and drive systems shall be closed loop which include position and velocity feedback devices to regulate the speed of the elevator within +/- 2% of contract speed with any load from empty to rated capacity.

.2 There shall be an isolation transformer between the power and the elevator drive system. The total harmonic and individual harmonic distortion shall not exceed 5% and 3% respectively and the requirements of IEEE-519 shall be adhered to with respect to power harmonics. For purposes of measurement the Point of Common Coupling (PCC) shall be defined as the elevator power supply terminals located in the elevator machine room.

.3 For gearless elevators provide a full re-generative drive system to return power generated during dynamic braking or running with overhauling loads to the power supply lines.

.3 Cab Load Weighing Device:

.1 Provide a cab load weighing device consisting of a strain gauge mounted on the cab crosshead and electronic logic to interpret the signal from the sensor.

.2 Signals shall be provided to the elevator control system to indicate car overload, hall call bypass, anti-nuisance, and for light and heavy load dispatching purposes.

.3 The device shall incorporate an automatic reset feature which will allow the device to be re-calibrated without test weights after the initial adjustment and set up.

.4 The device shall have a resolution and be accurate to within +/- 50 lb.

1.11. MAINTENANCE OF THE ELEVATOR(S)

.1 For a period of one (1) year from certified date of substantial performance of the Project, the maintenance of the elevators will be the responsibility of the Elevator Installation Contractor.

.2 This maintenance shall include regular inspection, adjustment, and lubrication, call back for faulty operation, and the replacement of all parts and components which fail for any reason other than through malicious damage or gross misuse of the equipment. This shall include parts replaced as part of warranty as well as parts to be replaced due to normal wear and tear.

.3 The elevator contractor shall respond without extra charge to call backs on a 24 hour basis. However, all work other than call backs shall be done during regular working hours.

.4 The maintenance shall be performed in accordance with the University of Alberta’s standard elevator preventative maintenance agreement requirements except that no parts or repairs shall be excluded during the
one (1) year warranty maintenance period. (Copy available on request)

.5 The installer shall maintain a stock of parts in the equipment room and local warehouse adequate for repair and replacement.

.6 As part of the Maintenance Service the contractor shall be responsible to service and maintain, and operate all elevator emergency circuits including the emergency recall and emergency power features in regular University scheduled testing.

.7 Frequency of examinations and reporting shall all be in accordance with the University of Alberta’s standard elevator preventative maintenance agreement requirements. (Copy available on request)

.8 At least 30 days prior to expiration of the warranty maintenance period, the contractor shall schedule a final inspection with Facility Management. All deficiencies noted shall be corrected prior to expiration of the warranty maintenance period.

1.12. SAMPLES AND SHOP DRAWINGS

.1 After award of the contract and prior to commencing any work on site submit shop drawings, samples and approval forms for the review and approval of the University. As a minimum the following shall be submitted:

.1 A copy of the installation submissions provided to the regulatory authorities.

.2 Shop drawings for Main Layout and General Arrangement of Machine Room, Hoistway, Pit and Overhead equipment.

.3 Shop drawings for all Hall Entrances and Cab Enclosures.

.4 Shop drawings for all normal and emergency car and hall operating and signal fixtures.

.5 Samples of materials for car cab interiors for approval.

.6 Sample push buttons for approval.

.7 Sample tactile markings for approval.

.8 Drawing or Template for machine room floor openings for each traction elevator for approval.

.2 All samples and drawings must be reviewed and approved prior to manufacturing.

1.13. TECHNICAL INFORMATION AND SUBMISSIONS
.1 Submissions, Manuals, Wiring Diagrams and Software:

.1 The supplier shall include all technical information to allow qualified persons employed by the University or a 3rd party to perform all maintenance of the equipment, including all diagnostic efforts to determine the cause of malfunction. This shall include complete as-built electrical drawings, parts list, instruction manuals, etc. as listed below.

.2 The following information and/or submissions are required to be submitted at the completion of the project:

.1 Three (3) copies of complete operating and maintenance manuals complete with up to date technical bulletins. Manuals shall contain complete parts lists with exploded views of all assemblies.

.2 Three (3) copies of complete adjusting, start-up, diagnostic and troubleshooting manuals.

.3 Three (3) copies of as built wiring diagrams.

.4 Three (3) copies of final shop drawings showing General Arrangement and Layout, Cabs and Entrances.

.5 A minimum of five (5) copies of each key used.

.6 One (1) archive copy of all software used in the control system and special interface tools.

.3 Manuals shall be sufficiently detailed and shall include spare parts lists, drawings, adjustment procedures, testing procedures, troubleshooting procedures, diagnostic instructions, recommended spare part lists and the manufacturers recommended maintenance tasks and frequencies.

.4 It is understood that the software provided shall be for archive purposes only and shall be for the Owner’s exclusive use. A non-disclosure agreement will be signed by a representative of the Owner if required to protect the manufacturers rights to the exclusivity of the software.

.2 Special Tools:

.1 Provide any and all special tools used in the maintenance, repair, adjustments, troubleshooting and diagnostics of the equipment provided.

.2 Special tools provided shall be for the exclusive use of the Owner or the Owner’s contracted maintenance personnel and for the on-going maintenance, repair, adjustment, troubleshooting and diagnostics of the equipment.

.3 Provide any documentation, instructions, manuals, etc. to accompany the equipment provided.
1.14. MAINTENANCE TRAINING

.1 Prior to commencement of the warranty maintenance period and any extended maintenance the elevator contractors regular maintenance personnel and key maintenance personnel shall receive certified factory training for the preventative maintenance, repair and trouble-shooting of the new equipment, control systems and software provided. The Contractor shall be required to provide proof of this certification and training to the University as a requirement of Substantial Completion.

.2 Training and technical support shall be available directly to the University or to any Elevator Contractor. Provide details on what training is available directly to the University or third party including location, cost and scope of the training.

1.15. REPLACEMENT PARTS

.1 Replacement parts for the elevator control system and other components provided shall be made available directly to the University or to any Elevator Contractor on the same basis and at reasonable industry standard prices. The provision of replacement parts or components for the equipment shall not be withheld by the elevator contractor or manufacturer for any reason.

D1020 Escalators, Dumbwaiters

.2 General:

.1 Escalators shall only be considered after review with the University and may only be considered in buildings with heavy concentrated traffic flows such as sport facilities, auditoriums, and bookstores. The design and installation of these systems shall be done only by a manufacturer of these systems and shall be reviewed and approved by the University. Co-ordinate the design of the system with other building systems.

.2 No proprietary equipment shall be installed.

D1090 Other Conveying Systems