UNIVERSITY OF TORONTO | Facilities & Services

Elevator design standard

Revision 03

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UNIVERSITY OF TORONTO | Facilities & Services

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1 General

1.1 Definitions

1.1.1 **Architect**: a group of consultants responsible for the design of the project in its entirety. Depending on the project, the design team shall include all core disciplines such as, architectural, mechanical, electrical, structural, and civil. For most projects, the architect is the prime consultant that manages the deliverables for the design team.

1.1.2 **Proprietary:** any elevator equipment being supplied and installed where the vendor producing the product does not: sell parts (exchange is not acceptable), sell tools needed to maintain and adjust the equipment (including elevator and drive parameters), attend site for support, provide training to any contractor maintaining the equipment.

1.1.3 **TSSA:** Technical Standards and Safety Authority, the Authority Having Jurisdiction (AHJ) in Ontario for regulating elevating equipment.

1.1.4 **Elevating Device, Elevating Equipment, Escalator, Accessible Lift, Stair/Chair/Platform Lift:** any device that is either regulated under TSSA O.Reg. 209/01 (Elevating Devices) or identified under B44, B355, B311 and Z185 and is used for the purpose of moving objects or people.

1.1.5 **MRL:** Machine Room Less elevator. This Device will be installed with either a closet for the control room or without a closet for a control room (control equipment located in the door jamb).

1.1.6 **Elevator Consultant**: a nationally recognized, at least five-years in business, professional elevator engineer firm licensed with the TSSA on the type of elevator equipment being proposed and with a certificate of authorization from Professional Engineers Ontario and appropriate insurance coverage. The Elevator Consultant shall be engaged by the Architect when the scope of work includes elevating devices modifications. For standalone elevator projects, any reference to “Architect” to be replaced with “Elevator Consultant”.

1.1.7 **GFCI**: Ground Fault Circuit Interrupter

1.1.8 **FEO**: Firefighters’ Emergency Operation

1.1.9 **EPO:** Emergency Power Operation.

1.1.10 **Client**: representative of University Planning, Design and Construction (“UPDC”) and Facilities and Services (“F&S”)

1.1.11 **COP**: Car Operating Panel

1.1.12 **Passenger elevators**: designed to transport people between building floors, prioritizing comfort, aesthetics, and compliance with accessibility standards.

1.1.13 **Service elevators**: intended for moving building staff, maintenance personnel, and equipment, with durable finishes and higher load capacities to withstand frequent use and potential impact; however, they are still classified as passenger elevators under applicable codes.

1.1.14 **Freight elevators**: built for transporting goods, heavy loads, or large equipment, featuring reinforced floors, wide door openings, and controls suitable for material handling operations, and may only be operated by trained personnel.

1.1.15 **Fixtures**: fixture in an elevator refer to the visible operating and control components installed inside the car and at each landing that allow passengers or operators to interact with the elevator system. This includes items such as car operating panels (COPs), hall call stations, indicator lights, position displays, door open/close buttons, emergency communication devices, and any associated signage or instructional plates.

1.2 License

1.2.1 Only elevator vendors who can provide proof of certification by the TSSA to work on the specific category of elevating device being designed and installed shall be permitted to submit a proposal for the work.

1.2.2 The TSSA license shall be registered to: **St George Campus** Account #182489 University of Toronto, 255 McCaul St, Toronto, ON M5T 1W7.

1.3 Elevator system

1.3.1 Elevator controls, systems, motors, ropes software, hardware, or drives shall only be provided if the proposed solution demonstrates a minimum of five years of proven, successful operation in the Greater Toronto Area.

1.4 Samples and documents

1.4.1 Samples (as applicable) to be submitted for review by the Client include:

1.4.1.1 Brochures of controls and their capabilities.

1.4.1.2 Brochures of fixtures.

1.4.1.3 Brochures of drive proposed and their capabilities.

1.4.1.4 Brochures of door operators and their capabilities.

1.4.1.5 Brochures of machines and their capabilities.

1.4.1.6 Brochures of governors and their capabilities.

1.4.1.7 Brochures of cylinder design (where MRL conversions are not possible).

1.4.1.8 Brochures of standard finishes proposed by supplier of non-Proprietary elevators where no design is proposed by Client.

1.5 General design requirements

1.5.1 This standard shall be read in conjunction with the Facility Accessibility Design Standard, Deliverable Standard, Security and Access Control System Design Standard, Tri-campus Energy Modeling and Utility Performance Design Standard, Fire Alarm Systems Design Standard, and Sprinkler and Standpipe Design Standard.

1.5.1.1 Information on any proposed alternatives shall be documented in the building design standard variance request form and submitted for the Client's review. Refer to the Deliverable Standard.

1.5.2 Type of elevators:

1.5.2.1 Traction elevators are required with overhead machine rooms.

1.5.2.1.1 Basement tractions are permitted where building conditions prevent the use of overhead traction machines.
1.5.2.1.2 Side mounted elevators are not permitted due to difficulties in maintaining the elevating devices and excessive wear and tear.
1.5.2.1.3 MRL elevators are acceptable in a machine room format. If machine room is not feasible, a closet for the controller is required.

1.5.3 Hydraulic elevators are not permitted for passenger elevators.

1.5.3.1 Applications that would be considered acceptable are:
- 4536 kg (10,000 lb) freight elevators
- Accessibility Platform Lifts (type A or B)
- Elevators with rises less than 3 m
- Devices falling under CSA B355, B311 and Z185,

1.5.3.1.1 Where hydraulic elevators are selected (lifts, platforms, stage elevators, etc.) multi-stage hydraulic cylinders are not permitted.
1.5.3.1.2 Roped hydraulic is required in lieu of multi-stage cylinders.
1.5.3.1.3 Piston followers are not permitted.

1.6 Default elevator sizes

1.6.1 During the initial phase of design (concept and feasibility stage), the Architect shall assume the following elevator sizes with respect to planning the layout of the building without confirmed building traffic analysis.

1.6.1.1 Traction overhead elevators shall have the minimum requirements:

1.6.1.1.1 Sized for 1135 kg.
1.6.1.1.2 1065 mm wide side opening door on the front of the car.
1.6.1.1.3 For front and rear opening, the doors should be arranged diagonally to allow for prone stretcher application.
1.6.1.1.4 The typical speed is 1.5 m/s for buildings less than six stories 18.2-19.5 m (60- 64 ft) high, typical speed is 1.75 m/s for buildings above six stories but less than thirteen stories 39.6-55.5 (130-182 ft).

1.6.1.2 Final speed and capacity to be confirmed through the traffic analysis completed by the Architect.

1.6.2 For “back of house” applications, in buildings that require medical or hazardous waste removal or transportation of liquid hydrogen or lab equipment, where concentrated loading and unloading is needed, provide a “hospital shape service elevator” where the depth is greater than the width. Require a 2045 kg service car with two speed side opening doors.

1.6.3 For heavy duty freight type loading, Architect to determine the door width needed. Once the door width is determined, add an additional 380 mm on one side for the door motor and 500 mm on the other side for the counterweight. The depth of the elevator shaft shall consider the largest component needed to be moved inside the elevator.

2 Design criteria

2.1 Traffic analysis

2.1.1 The capacity, speed, number, and placement of elevators shall be validated through a traffic analysis.

2.1.2 The Transportation Systems in Buildings Guide “D” by the Chartered Institute of Building Services Engineers (CIBSE) shall serve as the basis for the traffic analysis.

2.1.3 Computer simulation shall be conducted to model elevator system demand and assess efficiency of the configurations. Equipment shall be selected based on the configuration that achieves optimal average waiting time.

2.1.4 The Architect shall confirm elevator performance and design specifications in the report (Design Report).

2.1.5 The Design Report shall include the following information:

2.1.5.1 Building floor to floor height.

2.1.5.2 Building density per landing clearly identified with explanation of logic.

2.1.5.3 Entrance bias per floor used in percent.

2.1.5.4 All elevator performance data assumed including the jerk, acceleration, doors open and close speeds, etc.

2.1.5.5 Elevator dispatching type.

2.1.5.6 Home floor.

2.1.5.7 Population activity: Incoming%, outgoing%, inter-floor%, absence%.

2.1.5.8 Capacity factor by mass%.

2.1.5.9 Traffic template (CIBSE model used).

2.1.5.10 Result of simulation, pass/fail, including file name used in the simulation.

2.1.5.11 Number of elevators needed, capacity, speed and door type.

2.1.5.12 Target outcome vs. actual simulation results.

2.1.5.13 Where single elevator is proposed, provide a redundancy plan if elevator is not working.

2.1.5.14 For a building with 4 landing or more, at least two elevators shall be provided if the traffic analysis suggests that only one is sufficient.

2.2 Building-specific requirements

2.2.1 Traffic analysis shall account for the unique operational and occupancy characteristics of different Client’s buildings.

2.2.2 Where data is not available, Client shall be consulted on the building density data as it relates to various buildings type:

- Academic Buildings
- Laboratory and Research Facilities
- Libraries and Study Spaces
- Residence

2.2.3 The Architect shall provide a proposed density plan for review by Client. This shall be confirmed prior to commencement of analysis.

2.3 Elevator Interior

2.3.1 Prone stretcher requirement shall be implemented on all cars.

2.3.2 Only one car needs to be compliant in any bank.

2.4 Machine room

2.4.1 Ensure that all pipes over machinery and or electrical components are protected by trays with drains to ensure that no drips or condensation can fall on any elevator equipment.

2.4.2 Elevator machine rooms shall not be located below bathrooms.

2.4.3 The temperature of the machine room shall be maintained between 16°C (60°F) and 27°C (80°F) with relative humidity not exceeding 85% (non-condensing), follow the manufacturer's guideline.

2.4.4 HVAC system is required in every machine room. Do not install HVAC system in areas where machine guarding will prevent access to the HVAC system to perform maintenance. Keep the system in areas away from the elevator and electrical equipment.

2.4.5 For hydraulic systems (where approved), where oil coolers are used, the heat from the oil cooler shall be vented directly outside the machine room to prevent heat accumulation and ensure proper ventilation.

2.4.6 All elevator machine room doors shall be equipped with Salto Fob access systems in compliance with University of Toronto Security and Access Control Design Standard.

2.5 Paint

2.5.1 The machine room shall be painted as follows:

2.5.1.1 Floors, pits and high spill areas shall be painted in light grey epoxy paint with a semi-gloss finish.

2.5.1.2 Walls shall be painted in Acrylic.

2.5.1.3 All structural steel shall be painted black Alkyd Urethane.

2.5.1.4 Machine room guarding shall be painted black.

2.5.1.5 All rotating components in yellow.

2.5.2 For traction overhead devices, provide means for the removal of major equipment components for repair, either through a trap door in the machine room floor connecting to the top floor served, or through access to the roof and then via a crane to the ground.

2.6 Machine room guarding

2.6.1 Machine rooms shall include guarding to prevent accidental contact with rotating, moving, or high-voltage components in accordance with the TSSA requirements when implementing Ontario Regulation 851, sections 24, 25, 75 and 76 of the Regulations for Industrial Establishments.

2.6.1.1 Guarding shall be bonded to a dedicated ground.

2.6.1.2 All global guarding shall be equipped with tool fastened access doors.

2.6.1.3 Compliance of global guarding shall be certified by an engineering letter confirming compliance with the applicable laws.

2.7 Controllers

2.7.1 Elevator control systems and components shall be non-proprietary.

2.7.2 When elevators within a single bank or group are installed across multiple construction phases or contracts, all subsequent installations shall use the same manufacturer as the existing equipment. The initial design shall accommodate future installations, including provisions for system compatibility, control integration, and consistent operational performance.

2.8 Hoist ways & pits

2.8.1 Fall arrest anchor points shall be installed in accordance with the Client's Environmental, Health, and Safety standards.

2.8.1.1 Pits deeper than 2.74 m (9 ft) shall have a walk-in door entry instead of ladders.

2.8.2 A dedicated GFCI electrical outlet shall be installed for power tools and testing equipment.

2.9 Elevator shafts

2.9.1 Elevators serving parking garages (or spaces that are not temperature controlled, or observation elevators exposed to the outside temperature variation) shall be enclosed within a climate-controlled elevator shaft and lobby or vestibule.

2.9.2 Where MRL elevators are approved, operating temperatures between +5°C and +40°C, and a relative humidity of 30% and 50% shall be maintained. The operating conditions should take into account drive heat load, transformer heat loads and controller heat loads.

2.10 Stack effect mitigation

2.10.1 For elevators with a travel distance exceeding 30 m, the building design shall minimize or eliminate the influence of stack effect.

2.10.2 At all landings exposed to the open environments (access/egress/tunnels/loading dock/etc.), the doors on these landing shall be equipped with a sill closer and spirators.

2.11 Guiding systems

2.11.1 Elevator systems shall incorporate roller guides for both the car and counterweight.

2.12 Compensation

2.12.1 Compensation devices shall be installed when travel distance is equal to or exceeds 36 m.

2.12.2 For speeds up to 2.5 m/s:

- Use chain-type compensation to counterbalance the weight of hoist cables and the unbalanced portion of traveling cables.
- Chains shall be encapsulated to minimize noise and provided with sufficient length to allow for an adequate loop in the pit.
- Provide electrical switches to disable the elevator in the event that the chain gets caught or dislodged.

2.12.3 For speeds greater than 2.5 m/s:
- Use steel cables for compensation, attached to the undersides of the car and counterweight.

2.13 Cables

2.13.1 Shielded cables requirements:
- Provide a minimum of 10% spare conductors in all cables and signal wiring runs to allow for future upgrades.
- Provide one (1) coaxial, eight (8) shielded pairs, four (4) 18gauge wires to be used exclusively by the Client.

2.13.2 Cable termination:
- Connect spare conductors and shielded wires continuously from point of origin to destination using terminal blocks in the car, hoist way, and controller, as necessary. No splices are permitted.

2.14 Service and freight elevators

2.14.1 Service elevators shall be included whenever a building has more than one car.

2.14.1.1 The loading classification shall be Class C3.

2.14.1.2 Exception - if the loading requirements exceed 1,219 mm (48”) width of a typical service elevator door than a freight elevator shall be used.

2.14.2 Freight elevators with automatic doors with wifi communication shall only be provided for “back of the house” applications where students are not interacting or using these devices. They shall be installed in medical buildings, laboratory type facilities, medical waste areas and where heavy loading and unloading is needed.

2.14.2.1 The loading classification shall be Class C1.

3 Signals and fixtures

3.1 General Fixture Requirements

3.1.1 All fixtures shall be constructed using vandal-proof materials and assembly methods. This includes, at a minimum:

3.1.1.1 Finishes: Brushed or textured stainless steel (Type 304) to resist scratching, denting, and corrosion.

3.1.1.2 Buttons: Solid metal or stainless-steel button caps, flush-mounted or with minimal projection to reduce prying points. The backing/housing mechanism shall also be stainless steel to prevent breakage or “popping” under force.

3.1.1.3 Lenses/Covers: Polycarbonate or other impact-resistant, shatterproof, flame-resistant materials, secured in a manner that prevents removal without specialized tools.

3.1.1.4 Fasteners: Tamper-proof screws (e.g., pin-in Torx, snake eye, or star-shaped Torx security screws) to prevent unauthorized removal or disassembly.

3.1.1.5 The design and installation shall ensure that fixtures can withstand deliberate abuse, heavy use, and cleaning without degradation of function or appearance.

3.1.2 Car and hall call buttons shall have stainless targets and illuminate upon activation using energy-efficient LED technology. The button styles, finishes, and placement shall be reviewed with the Client.

3.1.3 Only flash mounted fixtures are acceptable.

3.1.4 Hall call buttons shall illuminate green for UP calls and red for DOWN calls.

3.2 Hall stations

3.2.1 Hall stations shall be provided at each landing and include floor call buttons with tactile and Braille markings.

3.2.2 Buttons shall illuminate upon activation and include tactile features, such as braille and raised symbols.

3.3 Position Indicators & Hall Lantern

3.3.1 Provide at each landing a forward facing, a digital LCD screen-based position indicator with hall lantern to show the status of the elevator at all times, adjacent to the doors. Include front and rear opening doors.

3.3.2 Hall lantern shall protrude from the fixture so that it is visible from 180 degrees from the door.

3.3.3 The LCD digital position indicator shall display the location of the elevator, the direction, the status of the elevator operation including but not limited to:

3.3.3.1 FEO

3.3.3.2 EPO

3.3.3.3 Independent service

3.3.3.4 Car top operation

3.3.3.5 Sabbath operation

3.3.3.6 Not in service

3.4 Elevator Designation

3.4.1 The elevator designation shall be permanently engraved or etched outside the elevator at each lobby or landing on the door frame or header for proper identification. This requirement is for every landing.

3.4.2 These identifiers shall be consistent with the building’s signage and wayfinding system.

3.5 Car Operating Panel (COP)

3.5.1 Dual COPs shall be provided for elevators with front and rear openings and on centre opening doors with three or more floors.

3.5.2 Swing return COPs are required.

3.5.3 The following features shall be integrated into the COP:

- Alarm activation button: mechanically activated and distinct from two-way communication button
- Emergency lighting shall activate the cab lighting fixtures.

3.5.4 The cabinet shall house:

- Fan speed, lighting controls, and other operational features.

- Test facilities for emergency lighting
- Volume control for the speaker

3.5.5 The elevator designation shall be permanently engraved or etched service panel.

3.5.6 Each main COP shall include a flush-mounted service cabinet with a keyed lock (Refer to section 3.8 Elevator keys for designated key type).

3.6 Card reader security provisions

3.6.1 All elevators shall support card reader access systems as specified by the Client's Lockshop and Campus Safety.

3.6.2 Card reader interface for access control shall be provided. The card reader shall be equipped with a lockable access control panel (Refer to the EPCO key guide for designated key type) to house the card reader located behind a lexan panel. The studs on the panel shall be spaced to accommodate the card reader being used by the Client.

3.7 Voice annunciator

3.7.1 The system shall include adjustable volume controls.

3.8 Elevator Keys

3.8.1 The following list of keys shall be used on all elevator systems.

3.8.1.1 Service keys shall be standardized to EPCO key types as follows:

- EPCO 1: Car service panel, independent service, fan, Car to lobby
- EPCO 2: Car light
- EPCO 3: Fan
- EPCO 11: Communication/ Phone line reset
- EPCO 12: Swing Operation
- EPCO 14: Security lockout access
- EPCO 15: Security Card Reader Service Panel
- EPCO 18: Handicap Lifts
- EPCO 20: Commercial/Industrial Lifts
- EPCO 22: Sabbath Operation
- EPCO 26: Code Blue
- EPCO 27: Car top service, Car panel
- EPCO 45: Hazardous service key
- EPCO MFD1: Emergency Power
- FEO-K1: Fire Service

3.9 Naming convention

3.9.1 Elevator names include the building number and the type of designation, followed by a unique numeric identifier and optional specialized function codes:

- P: Passenger (e.g., P1, P2)
- S: Service (e.g., S1, S2)
- F: Freight (e.g., F1, F2)
- D: Dumbwaiter (e.g. D1, D2)
- A: Accessible or medical (e.g., A1)
- L: Lifts, such as platform or chair lifts (e.g., L1, L2)
- E: Escalators or moving walks, or shopping carts (e.g. E1, E2)

3.9.2 For floor designations within elevator systems, the following conventions apply:

- B: Basement.
- P: Parking (e.g., P1, P2 for multiple levels)
- SB: Sub-basement (e.g., SB1, SB2 for levels below the main basement).
- C: Concourse
- ME: Mechanical Rooms
- L: Lobby
- 1 or G: Main Floor
- 2, 3, 4, 5 etc.: Upper Floors
- 2A: Split levels or half-floors between main levels
- MZ: Mezzanine - for intermediate or partial floors between major levels
- R: Roof - for roof access or rooftop facilities
- PH: Penthouse - for top floors
- T: Terrace - for outdoor terrace levels
- D: Dining or Food Court - for levels designated for food service
- E: Event level - for arenas, performance halls, or specialized event areas
- AM: Amenity level
- TH: Theatre level
- PL: Pool level
- GM: Gym level
- AU: Auditorium level

3.9.3 Plaques shall be installed to the right of each button, incorporating a blank insert and removable plate to allow for engraving.

4 Technical requirement

4.1 Passenger elevator cab interior

4.1.1 Materials and components shall be approved by the Client. Provide samples, drawings or rendering for the Client to review.

4.1.2 Flooring

4.1.2.1 Grey porcelain non-slip tile flooring in gradient tones, in 600 mm by 600 mm size shall be used in a staggered layout.

4.1.2.2 All elevators shall be equipped with custom-fit, high-commercial-grade bi-level matting featuring reinforced rubber nubs, rubber backing, and rubber edging, ordered and cut to match cab dimensions as per approved cab drawings.

4.1.3 Ceiling

4.1.3.1 Equally sized stainless-steel panels with brushed #4 finishes shall be used for the ceiling:

4.1.3.1.1 Six or nine (depending on cab size) high powered (7 Watts) LED light fixtures with natural light rendition, supported with black anodized aluminum frames shall be provided.

4.1.3.2 A two-speed fan and stainless-steel vent shall be provided.

4.1.4 Cab Doors

4.1.4.1 18 ga. Stainless steel shall be used to clad the doors.

4.1.5 Front wall

4.1.5.1 Stainless steel shall be used to clad the front wall.

4.1.6 Rear Walls

4.1.6.1 One (1) equally sized section, J-trimmed panel shall be used with high impact tempered silver mirror from the handrail to drop ceiling separated by brushed #4 stainless steel reveals.

4.1.6.2 Two (2) equally sized sections, J-trimmed panel Plastic Laminate from Formica (or equivalent) gray colour with wood grain (e.g. Asian Night 7949) from the handrail to the kick plate separated by brushed #4 stainless steel reveals shall be used.

4.1.6.3 Stainless steel reveals and kick-plates shall be used

4.1.7 Side Walls

4.1.7.1 Two (2) equally sized sections, J-trimmed panel Plastic Laminate from Formica (or equivalent) gray colour with wood grain (e.g. Asian Night 7949) from the ceiling to the kick plate separated by brushed #4 stainless steel reveals shall be used.

4.1.8 Handrail

4.1.8.1 Handrails shall be constructed of Type 304 stainless steel for all applications. If corrosive materials are used in laboratory or medical facilities, Type 316 stainless steel shall be used. Round handrails shall be used on all 3 walls

4.1.8.2 Provide cornered or turned in handrails in the corner and front side of the cab.

4.1.8.3 Mount handrail on #4 stainless steel reveals.

4.1.9 Extras

4.1.9.1 For interior protection, cabs shall be equipped with stainless steel hooks mounted directly to the cab walls to hang fire-resistant protective pads. Pats shall cover all wall sections, including cutouts for panels, and shall not obstruct accessibility features.

4.2 Service Elevator Cab Interior (requirements different than passenger elevator)

4.2.1 Flooring

4.2.1.1 Aluminum checker plate flooring shall be provided that is flush mounted on marine plywood and flooring is fastened with countersunk screws.

4.2.1.2 A stainless-steel sill supported by angle iron steel to prevent deflection shall be provided

4.2.2 Ceiling

4.2.2.1 A light aluminium drop ceiling shall be provided with nine satin stainless steel ceiling panels (three centre panels equally bordered with six panels) with lights located in the centre of each.

4.2.3 Front wall

4.2.3.1 The front wall shall be clad in #4 vandal resistant 5WL or similar stainless steel; including the transom and header above the car station and door; strike, header and jamb posts; and front return and front of the cab and the kick plate.

4.2.4 Rear and Side Walls

4.2.4.1 The rear wall shall have four horizontal panels, equally sized, split from the handrail; that are bonded in at least 12.7 mm (½") stainless steel. The binders between all panel shall consist of a 50.8 mm (2") thick #4 finish stainless bar.

4.2.5 Handrails

4.2.5.1 Non-cornered handrails shall be provided

4.2.5.2 A bumper rail with 102mm (4") tall bumper at the bottom of the car shall be provided on all sides.

4.3 Freight Elevator Cab Interior (requirements different than passenger elevator)

4.3.1 Rear and Side Walls

4.3.1.1 Rigidized Metal vandal resistant stainless-steel walls (5WL colour series) shall be provided from floor to ceiling.

4.3.1.2 Stainless steel J-trim moulding at the vertical joints, top and bottom level to properly terminate the cladding and prevent the stainless steel from peeling off, shall be included.

4.3.1.3 Wooden bumpers shall be provided on the side walls 254mm (10") height by 38.1mm (1.5") deep for the length of the elevator cab, with each side bevelled at 30-degree angle and install the bumper 50.8mm (2") above the floor plate.

4.3.1.4 Wood shall be stained and sealed for protection.

4.4 Elevator equipment

4.4.1 Monitoring and diagnostics

4.4.2 Controllers shall feature onboard systems for real-time monitoring and diagnostics, including car position displays via LED.

4.4.3 Circuits with volatile memory shall include battery backup to prevent data loss during power interruptions.

4.4.4 Load management and anti-nuisance features

4.4.4.1 Load weighing system shall be included to bypass hall calls when car loads reach 70% of rated capacity, while continuing to respond to car calls. Adjustability from 0–100% capacity shall be provided.

4.4.4.2 Use the infrared detector in conjunction with load weighing to cancel all calls where the elevator stops at two consecutive floors without triggering the infrared detector.

4.5 Energy efficiency

4.5.1 Provide controls to reduce cab power consumption during periods of inactivity by turning off lighting and ventilation systems. Systems shall reactivate immediately upon call demand.

4.5.2 Systems shall maintain emergency functionality, ensuring call buttons, alarms, and communication systems remain operational during energy-saving modes.

4.5.3 Provide means to dissipate regenerative energy on emergency power.

4.6 Traction equipment

4.6.1 Traction elevators shall be equipped with regenerative solid-state motor drives.

4.6.2 Motor drives shall include regenerative VVVF drives with power feedback capabilities.

4.6.3 Traction equipment shall support at least 200 motor starts per hour.

4.7 Hydraulic equipment

4.7.1 Hydraulic elevators shall be holeless plunger systems.

4.7.2 Power units:
- Rated for at least 80 motor starts per hour.
- Provide microprocessor-based starters to limit starting current to no more than 2.5 times full load running current.

4.8 Annunciator panel

4.8.1 Provide the design for an annunciator panel to be installed at the Building EVAC station or within the CACF room. The panel shall include the following features:
- Phase 1 Fire Emergency Recall Key Switches: one per car or group of elevators, compliant with CSA B44 requirements.
- Emergency Power Status Indicators: one light per car or group of elevators, clearly showing emergency power status.
- Two-Way Voice Communication: enable direct communication between the annunciator panel and each elevator cab within the building.
- A handset for direct communication with all elevators in the building.
- Durable stainless-steel housing with permanently engraved operating instructions.

4.8.2 120VAC power supply connected to the emergency generator circuit for the Rescue Station shall be provided by others under the direction of the Client.

4.8.3 Internet access with battery supplied backup to remain in active service during power interruption.

4.8.4 All required interconnecting wiring between the elevator hoist way (at grade level), and the annunciator panel shall be provided, with conduit installation completed in coordination with the electrical trade.

4.9 Elevator connection and integration

4.9.1 The elevator designs shall include provisions to enable connection to a centralized monitoring system (CMS) that allows real-time interactive monitoring and control. The following requirements shall be incorporated:
- Real-time visualization of operations, including car configurations and performance metrics.
- Remote diagnostics and basic operational controls.
- Data logging and retrieval for performance analysis and troubleshooting.
- Centralized monitoring and control via a unified interface.

4.10 Materials

4.10.1 Door material on non-freight type elevators shall be made of stainless steel shall be ASTM Type 304.

4.10.2 Fasteners used in fixture faceplates shall match the finish of the respective faceplate.

4.10.3 Door material on freight type elevators shall be steel with cast steel door interlocks.

4.11 Telephone system

4.11.1 Program the system to directly call the Client's designated Campus Safety at 416-978-2222.

- Final confirmation of the number shall be coordinated with the Client prior to handover.

4.11.2 Where a dedicated landline is available, then use of VOIP is acceptable.

4.11.3 Cab camera to be IP-based high-resolution camera capable of monitoring the entire cab floor to ensure visibility during emergencies.

4.11.4 Equip the COP with a digital display, the manufacturer to be selected by Client. System to be capable of displaying emergency messages, car position, and floor-specific messaging.

4.11.5 Elevator emergency communication shall be telecoil capable.

4.11.6 Hands-free communication: integrated two-way voice, text, and video communication systems. Components (e.g., speaker, microphone, and camera) shall be mounted seamlessly behind perforations.

4.12 Emergency power

4.12.1 Where three-phase standby power is available, connect it to the elevator system to ensure that at least one elevator per group can operate at contract speed and capacity under standby conditions.

4.12.2 No standby power: if three-phase power is not available, provide:

- Traction elevators: a standalone UPS system or equivalent means to allow controlled drifting to the nearest landing. Doors shall open automatically to permit passenger egress.
- Hydraulic elevators: a standalone UPS system or equivalent means to allow the car to lower to a landing, with automatic door opening for passenger egress.
- The emergency power test affidavit shall be provided as part of the client turnover document.

4.13 Elevator features and policy

4.13.1 The following features are included in this design standard for the purpose of discussion and position on the matter.

4.13.1.1 Sabbath operation – elevators in residence buildings shall included. Signage shall be included as well as a switch to enable/disable the Sabbath operation. Refer to the EPCO key guide for designated key type.

4.13.1.2 Media screens – all passenger cars should have an option for a media screen. This means that all passenger elevators should be equipped with a 380 mm (15 in) diagonal cutout with stainless steel insert in place for implementation of the media screens.

4.13.1.3 Hazardous independent service – this feature shall have a two-position key switch: Off-ON and the key shall be removable in both positions. When this service is activated to "ON" via a special key - refer to the EPCO key guide for designated key type-the elevator enters an independent service mode where hall cars are no longer being answered, but the door will close automatically after 10 second of the car call being initiated. The door closes and proceeds to the selected landing with the doors open. The elevator does not leave the selected landing unless the HIS key is selected to OFF.

4.13.1.4 When the service is ON, a vanishing lens shall be illuminated with a flashing light along with a pulsating buzzer chiming at 60dBA-70dBA when the call button is pressed to alert of a closing door. The position indicator shall flash "exit elevator, door is closing".

5 Elevator integration, temporary use, and warranty

5.1 Warranty and post-construction adjustments

5.1.1 For modernization projects, the following sections apply.

5.1.2 Provide a two (2) year, twenty-four (24) month warranty covering all equipment and products. Upon receiving notice of a defect or deficiency, the Contractor shall immediately correct, within an agreed upon time, at its expense, all work found deficient or defective or being incapable of or unable to meet the design requirements, performance expectations or other specific operating criteria as established within the Contract Documents.

5.1.3 To be clear, warranty items cover all equipment that is not normally covered under the scope of the maintenance agreement and include items such as architectural finishes and aesthetical components like buttons, door finishes, scratches caused by adjustments, and other equipment installed by the elevator contractor, etc...

5.1.4 If the same component, device, or piece of equipment is found to fail or prove unreliable in two instances within the Warranty period, and the failure of said device cannot be attributed to faulty maintenance, misuse or unintended use, the elevator installer shall replace all such device components.

5.1.5 Should the Contractor delay or fail to make good items of Work as confirmed by the Client as being deficient during the warranty period, and after being given reasonable time to correct such deficiencies, the Client may arrange to have such defective or deficient work complete by another quality company or by using its own in house resources, and then back charge to the Contractor for all costs incurred to rectify deficient work.

5.1.6 Any wear or damage resulting from CTU operations shall not affect the warranty coverage.

5.1.7 Before the start of the warranty period, the vendor shall:
- Adjust elevator ropes to account for structural settlement or movement.
- Conduct a full inspection to restore the elevator to pre-construction condition, ensuring compliance with all performance and safety standards.