

RETURN BIDS TO:
RETOURNER LES SOUMISSIONS À:
Bid Receiving - PWGSC / Réception des soumissions -
TPSGC
11 Laurier St./11 rue Laurier
Place du Portage, Phase III
Core 0A1 / Noyau 0A1
Gatineau, Québec K1A 0S5

SOLICITATION AMENDMENT MODIFICATION DE L'INVITATION

The referenced document is hereby revised; unless otherwise indicated, all other terms and conditions of the Solicitation remain the same.

Ce document est par la présente révisé; sauf indication contraire, les modalités de l'invitation demeurent les mêmes.

Comments - Commentaires

THIS DOCUMENT CONTAINS A SECURITY
REQUIREMENT

Vendor/Firm Name and Address

Raison sociale et adresse du
fournisseur/de l'entrepreneur

Issuing Office - Bureau de distribution

Construction Services Division/Division des services de
construction
11 Laurier St./11 Rue Laurier
3C2, Place du Portage
Phase III
Gatineau, Québec K1A 0S5

Title - Sujet ELEVATOR MODERNIZATION	
Solicitation No. - N° de l'invitation EP076-121984/A	Amendment No. - N° modif. 006
Client Reference No. - N° de référence du client 20121984	Date 2012-05-09
GETS Reference No. - N° de référence de SEAG PW-\$\$\$FG-340-59521	
File No. - N° de dossier fg340.EP076-121984	CCC No./N° CCC - FMS No./N° VME
Solicitation Closes - L'invitation prend fin at - à 02:00 PM on - le 2012-05-17	
Time Zone Fuseau horaire Eastern Daylight Saving Time EDT	
F.O.B. - F.A.B. Plant-Usine: <input type="checkbox"/> Destination: <input checked="" type="checkbox"/> Other-Autre: <input type="checkbox"/>	
Address Enquiries to: - Adresser toutes questions à: Brouillet, Richard	Buyer Id - Id de l'acheteur fg340
Telephone No. - N° de téléphone (819) 956-0457 ()	FAX No. - N° de FAX (819) 956-8335
Destination - of Goods, Services, and Construction: Destination - des biens, services et construction: Health Protection Building 200 Tunney's Pasture Driveway Ottawa, ON	

Instructions: See Herein

Instructions: Voir aux présentes

Delivery Required - Livraison exigée	Delivery Offered - Livraison proposée
Vendor/Firm Name and Address Raison sociale et adresse du fournisseur/de l'entrepreneur	
Telephone No. - N° de téléphone Facsimile No. - N° de télécopieur	
Name and title of person authorized to sign on behalf of Vendor/Firm (type or print) Nom et titre de la personne autorisée à signer au nom du fournisseur/ de l'entrepreneur (taper ou écrire en caractères d'imprimerie)	
Signature	Date

Solicitation No. - N° de l'invitation

EP076-121984/A

Amd. No. - N° de la modif.

006

Buyer ID - Id de l'acheteur

fg340

Client Ref. No. - N° de réf. du client

20121984

File No. - N° du dossier

fg340EP076-121984

CCC No./N° CCC - FMS No/ N° VME

AMENDMENT 006

Solicitation No. - N° de l'invitation

EP076-121984/A

Amd. No. - N° de la modif.

006

Buyer ID - Id de l'acheteur

fg340

Client Ref. No. - N° de réf. du client

20121984

File No. - N° du dossier

fg340EP076-121984

CCC No./N° CCC - FMS No/ N° VME

THIS AMENDMENT IS BEING RAISED TO ATTACH ADDENDUM 1

ADDENDUM FOLLOWS.

End of amendment.

March 26, 2012

EP076-121984/A ELEVATOR MODERNIZATION
HEALTH PROTECTION BUILDING
OTTAWA, ONTARIO
PROJECT NO. R.004594.002

Page 1 of 1

The following changes in the tender documents are effective immediately. This addendum will form part of the contract documents.

SPECIFICATIONS

Section 14 20 03 Freight Elevator

1. Delete the entire section in its entirety.
2. Replace with Section 14 20 03 dated March 19, 2012.

Section 14 20 06 Passenger Elevator

1. Delete the entire section in its entirety.
2. Replace with Section 14 20 06 dated March 19, 2012.

End

PART 1 - GENERAL

1.1 Related Sections for Health Protection Building - Freight No. 1

- .1 Section 01 00 10 - General Instructions
- .2 Section 01 14 25 - Designated Substances Report
- .3 Section 01 35 29.06 - Health and Safety
- .4 Section 01 91 13 - General Commissioning Requirements
- .5 Section 09 91 23.01 - Interior Re-painting
- .6 Section 21 05 01 - Common Work Results - Mechanical
- .7 Section 26 05 00 - Common Work Results - Electrical
- .8 Section 28 31 00.01 - Fire Alarm Systems

1.2 Description of Work

- .1 This Section covers the modernization, design, engineering, fabrication, manufacture, installation, and inspection of One (1) Geared Overhead Traction Freight Elevator modified to Class C1 Loading, identified as Elevator #1 located in the Health Protection Building at Tunneys Pasture.
 - .2 All equipment to be designed to meet the space provisions as per site conditions.
 - .3 Provide all materials, labour, design, manufacturing, inspection, and testing as required to complete the work as specified in these Contract Documents.
 - .4 Arrange and pay for all permits, certificates, inspections and tests required by the governing authorities, including the Initial TSSA inspection and subsequent inspections and the initial Operating Licence on new installations or modernized elevators.
 - .5 Where a device or component is mentioned in the singular number, such references shall be understood to mean that the Contractor shall provide as many of said devices or components as is necessary for the completion of the elevator covered under this Specification.
 - .6 All equipment being replaced shall become the property of the Contractor, and as such, it is the responsibility of the Contractor to remove it from the premises in a prompt and orderly manner.
-

1.3 Description of Systems

.1 The characteristics of the existing freight elevator are as follows:

.1	Classification:	General Freight Loading Freight
.2	TSSA Installation #:	10123
.3	Retain Rated Net Capacity:	2727 kg.
.4	Retain Rated Speed:	.26 m/s.
.5	Travel:	From B floor to the 2 nd floor, a distance of approx. 7.7m
.6	No. of Stops:	Three (3)
.7	No. of Openings:	Three (3) front
.8	Entrance Type:	Bi-Parting
.9	Entrance Size:	Retain 1727 mm wide x 2235mm high
.10	Hoistway:	Existing 3302mm wide x 4064 mm deep
.11	Pit:	Existing 1397mm deep
.12	Overhead:	Existing 3962 mm to underside of machine beams

**ELEVATOR CONTRACTOR TO CONFIRM
ALL INFORMATION, MEASUREMENTS and FLOOR MARKINGS ON SITE**

1.4 Related Work by Elevator Contractor

Include the following related building work required to modernize the freight elevator.

- .1 Machine Room
 - .1 Patch flush to the floor with cement , all redundant holes in machine room floor resulting from the removal of the redundant elevator equipment.
 - .2 Provide a removable metal guard around the drive sheave and hoist ropes.
 - .3 Provide a licence frame holder for the elevator licence to be installed on the front of the controller door. Indicate on TSSA design submission that licence will be located in the elevator machine room.
-

Related Work by Elevator Contractor - cont'd

.2 Car Top

- .1 Paint the elevator and installation numbers on the crosshead.
- .2 Provide two permanently connected guarded lights on car top. One light to be a hand held type with magnetic base.
- .3 Provide a metal safety railing on the car top to B44 code requirements.
- .4 Provide removable metal guards for all sheaves on car top. Paint guards yellow as per Section 09 91 23.01

.3 Hoistway

- .1 Thoroughly clean down hoistway at completion of work. Complete all painting as specified in Part 3 - Cleaning and Painting.
- .2 Electrostatically paint all hoistway doors and frames. Colour choice by Departmental Representative. Paint as per Section 09 91 23.01
- .3 Run all new telephone, communication, elevator security and fire alarm lines and conduit in the hoistway to machine room. Others will run lines to the hoistway and provide sufficient wiring to reach machine room. Elevator Contractor to supply and install the conduit in the hoistway. All fire alarm wiring must be run in a separate conduit.
- .4 Remove all redundant elevator related electrical wiring and piping from the elevator hoistway.

.4 Pit

- .1 Paint all equipment in the pit including the floor as per Section 09 91 23.01
- .2 Paint pit ladder Yellow in colour as per Section 09 91 23.01
- .3 Provide two (2) new positive action type disconnect switches in pit. Locate one disconnect switch near top of ladder. Paint switches RED in colour, identify stop and run positions.

1.5 Machine and Overspeed Governor Guarding

- .1 Provide a removable metal guard around the machine as required by Section 24, 25, 75 and 76 of the OHSa requirements and CSA Standard Z432-04 - Safe Guarding of Machinery. Paint Guard Yellow.
 - .2 Provide a removable metal guard around the overspeed governor. Use 9mm expanded metal for the enclosure. Paint guard yellow.
 - .3 Securely fasten the overspeed guard to the floor with 6mm bolts.
-

1.6 On Site Documentation Required

- .1 **Before** any work commences on site, provide the following information and leave it in the machine room until the completion of the project.
- .2 A complete copy of the elevator specifications.
- .3 A copy of the Contractor's "lock out and tag out" procedures.
- .4 A copy of the Contractor's "accident prevention and safety policy" or a copy of the "elevator industry field employees' safety handbook".

1.7 Reference Standards

- .1 Comply with all building codes, by-laws, regulations, directives, and ordinances as set forth and mandated by Federal, Provincial, and Municipal Authorities, in effect at the time of installation.
 - .2 The following Standards as a minimum shall apply:
 - .1 ASME A17.1-2010/CSA-B44-10 Safety Code For Elevators, including latest supplements and Appendix E, Elevator Requirements For Persons with Physical Disabilities.
 - .2 The latest copy of the TSSA Code Adoption Document.
 - .3 B44.2.07 - Maintenance requirements and intervals for elevators, dumbwaiters, escalators and moving walks.
 - .4 CSA Standard B651-04 Accessible Design For The Built Environment.
 - .5 The National Building Code Of Canada - 2005.
 - .6 CAN/CSA-B44.1- 11/ASME A17.5 2011 Elevator and Escalator Electrical Equipment.
 - .7 CSA Standard C22.1-09 Canadian Electrical Code Part 1.
 - .8 Technical Standards And Safety Act, 2000 O.Reg 209/01 and O.Reg. 155/97 Certification and Training of Elevating Devices Mechanics.
 - .9 EN 12016-1998 Electromagnetic Compatibility-Product Family Standards for Lifts, Escalator and Passenger Conveyers Part 2-Immunity.
 - .10 Occupational Health and Safety Act and Regulations for Construction Projects O.Reg. 213/91 as amended by O.Reg. 631/94. R.R.O. 1990 Reg. 834.
 - .11 CSA Standard Z432-04 - Safe Guarding of Machinery.
 - .12 Occupational Health and Safety Act and Regulations for Industrial Establishments R.R.O. 1990 Reg. 851. S 24 & 25
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1.8 Definitions of Terms

- .1 The term Owner, as used herein, refers to: PWGSC.
- .2 The term Departmental Representative, as used herein, refers to an agent of the Owner, empowered to interpret drawings and specifications relating to the elevator equipment and systems.
- .3 The term Professional Engineer, as used herein, refers to: A Professional Engineer registered in the Province of Ontario.
- .4 The term elevator Contractor or Contractor, as used herein, refers to any person, partners, firm or corporation having a contract with the owner to furnish labour and materials for the execution of the work herein described.
- .5 The term sub-contractor, as used herein, refers to any person, partners, firm or corporation having a contract with the contractor to furnish labour and materials for the execution of the work herein described.
- .6 The term “refurbish”, shall mean to carry out all labour, painting or modifications to parts, etc, which will result in returning the original component to a “like new” condition. All refurbished equipment must be acceptable to the Departmental Representative.
- .7 The term Electrical Safety Authority, as used herein, refers to: The Electrical Inspection Authority in the Province of Ontario.
- .8 Where the terms “furnish” or “provide” are used, it shall mean to supply and install new equipment.
- .9 All terms in the specifications that are not otherwise defined shall have the definitions as given in the latest edition of the CSA-B44 Safety Code For Elevators.

1.9 Simplex Selective Collective Automatic Operation

- .1 Provide a micro-processor based selective collective control system.
 - .2 Dispatch car to corresponding landing upon momentary pressure of car or hall call buttons.
 - .3 Provide separate time delays for car and hall calls to enable freight handlers to enter or leave the car. Hold car for preset interval at landings where stops are made. Time delays to be adjustable from 0 to 15 seconds. Cancel interval upon registration of car call or pressure on door close button.
 - .4 Stop car at landings for which car calls are registered. Make stops in order in which landings are reached, regardless of sequence in which buttons are registered
-

Simplex Selective Collective Automatic Operation - cont'd

- .5 If no car buttons are registered and car starts UP in response to several DOWN calls, proceed to highest DOWN call and reverse to answer other DOWN calls. Similarly, when car starts DOWN in response to several UP calls proceed to lowest UP call, and reverse to answer other UP calls.
- .6 If the car stops for a hall call and a car call is registered corresponding to the direction the car was travelling, proceed in same direction regardless of other registered landing calls.
- .7 If DOWN hall calls are registered while car is travelling UP, do not stop for these calls but allow calls to remain registered.
- .8 After highest car and hall calls have been answered, reverse car automatically and respond to DOWN car and hall calls.
- .9 When no hall or car calls have been registered for a period of sixty (60) seconds return elevator to the bottom landing and park with doors closed.

1.10 Firefighters' Emergency Operation

- .1 Provide manual "Firefighters' Emergency Operation" in accordance with Clause 2.27.3 of the CSA-B44 Elevator Safety Code.
- .2 When required, an additional key-operated "FIRE RECALL" switch with two positions marked "OFF" and "ON" in that order, shall be permitted at "Building Fire Control Station" only.

1.11 Fire Operation Panel

- .1 The "FIRE OPERATION" switch, the "CALL CANCEL" button, the "STOP" switch, the door open button(s), the door close button(s), the additional visual signal and the operating instructions shall be grouped together at the top of a main car operating panel behind a locked cover.
 - .2 The firefighters' operation panel cover shall be openable by the same key that operates the "FIRE OPERATION" switch. The cover shall be permitted to open automatically when the car is on Phase I Emergency Recall Operation and at the recall level.
 - .3 When the key is in the "FIRE OPERATION" switch, the cover shall not be capable of being closed. When closed, the cover shall be self-locking. Where rear doors are provided, buttons for both the front and rear doors shall be provided in the firefighters' operation panel. The door open and door close buttons for the rear entrance shall be labelled "OPEN REAR" and "CLOSE REAR."
 - .4 All buttons and switches shall be readily accessible, located not more than 1800 mm above the floor. The front of the cover shall contain the words "FIREFIGHTERS' OPERATION" in red letters at least 10 mm high.
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1.12 Firefighters' Operation Instructions

- .1 Instructions for the operation of the elevator on Phase I Emergency Recall shall be permanently incorporated with, or adjacent to the "FIRE RECALL" switch at the designated level.
- .2 Instructions for the operation of the elevator on Phase II Emergency In-Car Operation shall be permanently incorporated on the rear of the fire panel door in the car.
- .3 The instructions shall be in letters not less than 3mm in height and shall be permanently installed and protected against removal or defacement.

1.13 Firefighters' Emergency Operation Key - FEO-K1

- .1 Provide a standard TSSA acceptable firefighters' operation key (FEO-K1).
- .2 The key shall be of a tubular type, 7-pin, style 137 construction and have a biting code of 6143521 starting at the tab sequenced clockwise as viewed from the barrel end of the key.
- .3 The same FEO-K1 key shall operate the elevator emergency power selector switch when provided, the fire recall switch and fire operation panel door.
- .4 The key switches shall comply with Clause 2.27.8 of the B44 Code and be of the Group 3 Security.

1.14 Identification

- .1 Provide 50mm numerals on all elevator equipment as previously specified. Include permanent numbers engraved in the elevator.
 - .2 Provide all necessary engraving on faceplates as required by the Departmental Representative, in English and French, Helvetica medium, upper and lower case.
 - .3 All fastenings of cover plates for signals, buttons and panels shall be tamper proof type.
 - .4 Identify elevator at recall level. Use metal plates permanently installed with rivets or a permanent type glue. Numbers to be minimum 50mm high.
 - .5 Provide raised character and braille floor designations on both door jambs minimum 50mm. Locate centre-line of numeral 1525 mm above floor level measured from the base line of the characters.
 - .6 At the main entry level on both door jambs provide a 50mm raised star designation to the left of the floor designation number. All characters to comply with Clause E-17.
 - .7 Provide at each floor, bilingual, Elevator Corridor Call Station Pictograph as per Figure 2.27.9 of CSA-B44 Code.
 - .8 Stencil and paint floor numbers, not less than 100mm in height, on the fascia and inside of the hoistway doors
-

1.15 Independent Service Operation

- .1 Provide independent service operation by means of a key operated switch in car to allow the car to operate independently in response to car calls only.
- .2 Park the car with the doors open, and respond to a selected car call by constant pressure on the door close button, provided, that the doors have been closed and the interlock is made-up. Arrange for the doors to reopen if the constant pressure on the door close button is released at any point prior to the car starting.
- .3 Place the direction of travel under the control of the attendant. Arrange the operation to cancel all registered car calls, and by-pass registered hall calls. do not operate hall lanterns when stopping at a floor.

1.16 Elevator Performance

- .1 Provide smooth acceleration and deceleration of car without perceptible steps so as not to cause operator discomfort.

1.17 Schedule and Cost Breakdown

- .1 Within three (3) weeks after award of the contract submit, to the Departmental Representative for approval, a bar chart schedule indicating anticipated progress stages.
 - .2 Include in this schedule, the following information:
 - .1 Submission of shop drawings after award of contract
 - .2 Submission of TSSA Design Submission Application
 - .3 Material delivery lead time after shop drawing approval
 - .4 Hoisting of new equipment to machine room and removal of redundant machine room equipment
 - .5 Installation of new machine room equipment
 - .6 Installation of hoist and governor ropes
 - .7 Set-up elevator to run on temporary inspection
 - .8 Travelling cable and hoistway wiring
 - .9 Installation of new hoistway door equipment
 - .10 Installation of car top wiring and levelling devices
 - .11 Minor cab refurbishing
 - .12 Installation and wiring of car station and hall fixtures
 - .13 Installation and refurbishing of pit equipment
 - .14 Final adjusting time
 - .15 TSSA Inspection
 - .16 Departmental Representative Acceptance Inspection
 - .17 Correction of deficiencies
 - .18 Installation of machine guarding
 - .19 Total modernization time
 - .3 During the course of the construction phase submit monthly ongoing work and material delivery schedule report. Indicate the percentage of work completed for labour and material.
-

Schedule and Cost Breakdown - cont'd

- .4 Submit a cost breakdown indicating the percentage or dollars value of the costs for the items listed below as a minimum.
 - .1 Engineering and TSSA submittals - maximum 5%
 - .2 Building related work
 - .3 Total Labour
 - .4 Machine, controller and drive
 - .5 Hoistway door equipment and wiring
 - .6 Hoist ropes, governor ropes and fastenings
 - .7 Fixtures
 - .8 Car cab refurbishing/painting
 - .9 Machine room equipment guarding
 - .10 Adjusting and TSSA inspections
 - .11 Operation and Maintenance Manuals
 - .12 Correction of deficiencies
- .5 Provide one week's notice prior to the completion of the elevator and the date anticipated for the inspection.
- .6 Review and update the work schedule as the completion of the work progresses and notify the Departmental Representative in case of modification.
- .7 If the work falls behind the schedule, take action as necessary to meet the schedule, including, but not limited to, extra personnel and overtime work, at no additional cost to the Departmental Representative.
- .8 Pay costs associated with this action unless the delay is caused by strikes, acts of government, riot, civil commotion, war, malicious mischief, act of God or any causes beyond the control of the contractor.

1.18 Samples

- .1 Submit, in duplicate, 76mm X 127mm samples for each following component for review by the Departmental Representative.
 - .1 Hall operating fixtures.
 - .2 Car operating fixtures and hall position indicators.
 - .2 Contractor is not to order any material or start any manufacturing until all drawings and or samples are approved by the Departmental Representative.
-

1.19 Shop Drawings

- .1 Submit shop drawings as required by Section 01 00 01.
- .2 Indicate on shop drawings the following information:
 - .1 A layout of the elevator equipment located in the machine room including all retained and new equipment complete with dimensions and weight.
 - .2 Characteristics of the equipment located in the machine room including KVA rating of transformer and heat dissipation of equipment.
 - .3 Drawings showing C1 Loading modifications to the cab platform. Drawings to be stamped by a Registered Professional Engineer.
 - .4 Car cab interior refurbishing drawings.
 - .5 Fixture details showing materials and finish. Hoistway doors and tracks.
- .3 Provide shop drawings of all elevator machine room guarding components.
- .4 Include machine guarding on the TSSA design submission as part of the modernization scope of work.
- .5 Contractor is not to order any material or start any manufacturing until all drawings and or samples are approved by the Departmental Representative.

1.20 Record Drawings

- .1 Provide record drawings as required.
- .2 In addition, provide schematic wiring diagrams, including all changes made in final work, covering electrical and solid state equipment as supplied and installed, with a list of symbols corresponding to identification or markings on both machine room and hoistway apparatus.
- .3 Provide an electronic copy of final "as built" wiring diagrams.

1.21 Operation and Maintenance Manuals

- .1 Provide all information necessary for the safe and efficient maintenance of the equipment and incorporate into the maintenance manuals.
 - .2 The maintenance data must include the following information:
 - .1 Description of system's method of lubrication, operation and control including, motor control system, door operation, signals, fire-fighter's service, and special or non-standard features provided.
-

Operation and Maintenance Manuals - cont'd

- .2 As built schematic wiring diagrams covering electrical equipment as supplied and installed, including changes made in final work, with a list of symbols corresponding to identification or markings on both machine room and hoistway apparatus.
- .3 Copies of Technical Standards and Safety Authority Design Submission and Final Inspection Report, Re-inspection reports, and a copy of the Warranty letter.
- .4 Copies of the Electrical Safety Authority Inspections.
- .5 Parts catalogue giving complete list of repair and replacement parts with cuts and identifying numbers.
- .3 Any special tools, hand held devices, computers etc. required for the operation, testing, adjusting or setting parameters for the controller or car door operator must be left on-site in the machine room and will become the property of the Owner for future servicing and maintenance. All special tools are considered part of the elevator package.
- .4 Maintenance control plan (MCP) as per CAD Part 3.1 - Clause 8.6.1.1.1

1.22 Interim Maintenance Service

- .1 The Contractor shall include full interim maintenance service, including overtime, for the existing elevator from the time of contract award until the issuance of the Final Certificate of Completion of the elevator modernization project.
 - .2 Include the cost of the interim maintenance in the base tender price.
 - .3 After the completion of the modernization project, provide long term maintenance service in accordance with the attached maintenance specifications.
 - .4 Perform all Tests and Examinations as required by CAD Section 8.6. The CSA-B44 Safety Code For Elevators, including any Supplements and the B44.2-07 Code. The frequencies specified in the B44.2-07 Code are a minimum. Should on-site conditions or manufacturers recommendations require more frequent procedures they shall be increased accordingly.
 - .5 Maintenance to include monthly systematic examination, cleaning, adjustment and lubrication of elevator equipment and the repair or replacement of all defective parts due to normal wear and tear. Do not remove elevator from service during peak periods. Use only genuine parts produced by the manufacturer of the equipment.
 - .6 Provide call back service 24 hours per day, seven (7) days per week, and the release of trapped persons at any hour, at no extra charge. The response time to remove trapped passengers during regular working hours shall be no longer than 30 minutes and no longer than 60 minutes after hours.
-

Maintenance Service - cont'd

- .7 Maintain locally, near the place of work, an adequate stock of parts for replacement or emergency purposes. Have qualified personnel under the supervision and in the direct employ of the Contractor available to ensure fulfilment of this maintenance service without unreasonable loss of time.
 - .8 Provide in the elevator machine room a metal cabinet for the storage of approved lubricants and cleaning supplies. Provide a metal storage can for waste and oily rags.
 - .9 Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of Departmental Representative.
 - .10 Maintain in the elevator machine room one (1) copy of the schematic wiring diagrams covering electrical equipment as supplied and installed, including changes made in final work, with a list of symbols corresponding to identification or markings on both machine room and hoistway apparatus. Laminate all wiring diagrams.
 - .11 The only Log Book acceptable by the Owner is the Elevating Devices Log Book #495-8A (Cdn/Bilingual) Elevating Devices Maintenance Log Book. The log book can be obtained from Log Books Unlimited at www.logbooks.com.
 - .12 The log shall be the property of the Departmental Representative and shall be kept on the job site and available at all time for the Departmental Representative's verification.
 - .13 Provide a permanent log (occurrence book) for the elevator with pre-numbered pages having the following information: date, time, regular maintenance, regular and overtime call back, names of maintenance technician, action taken, work completed and additional repairs required.
 - .14 Make all entries in ink, legibly, consecutively and without blanks.
 - .15 Computerized entries are not acceptable.
 - .16 Adjust the control system for optimum operation towards the end of the warranty period.
 - .17 Provide and leave in the machine room a maintenance control plan (MCP) as per CAD Part 3.1 - Clause 8.6.1.1.1
-

1.23 Power Supply

- .1 The existing 575 volt power supply will be retained.
- .2 Design all equipment to suit the existing supply. Power supply may fluctuate $\pm 10\%$.
- .3 The Elevator Contractor shall be responsible for providing a true earth ground, shielding, or bonding as required to suit the new elevator equipment. The true earth ground wire is to be the same size as the feeder wires.
- .4 Any modifications carried out to the existing electrical system in the elevator machine room relating to elevator work shall be carried out by a licensed electrician and be inspected by the Electrical Safety Authority at the completion of the work. A copy of the inspection permit and report must be provided to the Departmental Representative.

1.24 Markings

- .1 No trade marks shall appear on any piece of equipment visible to the general public.

1.25 Overtime Work Included

- .1 Carry out any odour or noise generating work such as interior painting, all welding, core drilling, jack hammering, saw cutting, grinding after normal working hours of the building and at a time which is acceptable to the Departmental Representative. Thoroughly ventilate areas painted during "off hours".
- .2 Obtain from the Departmental Representative, a "Hot Work Permit" where any cutting, welding, grinding, or any work that emits sparks or flames. Do not proceed with this type of work until the Hot Work Permit has been issued.

1.26 Use of Elevators For Persons with Physical Disabilities

- .1 Comply with the requirements of Appendix E of the CSA-B44 Safety Code For Elevators and all other governing codes and regulations.
- .2 Provide raised character and braille floor designations on both jambs of the entrance frames at all floors. Provide a raised star to the left of the floor designation symbol on both jams at the main entry level. All characters to be 50mm high.

1.27 Occupied Premises and Barricades

- .1 Take into consideration the fact that this is an occupied building and must continue to function during the course of the modernization with a minimum of disruption.
 - .2 The Contractor's employees shall be appropriately attired in Company Uniforms, be courteous to the occupants and abide by the same building rules and regulations required of the occupants.
-

Occupied Premises and Barricades - cont'd

- .3 All work must be performed in a manner that ensures the safety of the occupant and the user of the operating elevators. Should it be necessary to perform work where such safety cannot be ensured, it shall also be performed at a time acceptable to the Departmental Representative and during hours other than normal building business hours at no additional cost to the Departmental Representative.
- .4 All hoarding shall be removed at the end of the installation.
- .5 Provide barricades as required to protect the Public from hazardous conditions. Obtain Departmental Representative's approval for the appearance of all barricades erected.

1.28 Technical Seminar

- .1 Upon completion of the work, arrange with the Departmental Representative to provide a seminar in French and English for the Owner's staff.
 - .2 The seminar shall include a complete review of all documentation, operation of equipment, and demonstration of special features. Allow a minimum of four (4) hours for the seminar.
 - .3 Provide the Departmental Representative, with a laminated copy of the detailed procedures for resetting the Firefighters' Operation from the main and duplicate switches.
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PART 2 - PRODUCTS

2.1 Components

- .1 Use major elevator components from standard product line of one manufacturer unless otherwise approved by Departmental Representative. Major components includes; elevator machine, motor, controller, hoistway door and control equipment.
- .2 All materials and equipment shall be new. Furnish samples as directed by the Departmental Representative.

2.2 Wiring, Conduit and Fittings

- .1 Provide all new insulated wiring. Provide new wiring from the disconnect switch to the elevator controller.
 - .2 Provide insulated wiring having a flame retarding and moisture resisting outer cover. Run the wires in metal duct.
 - .3 Provide and connect all hoistway wiring, traveling cables, car wiring, etc., and all remote alarm indicators or other similar items, from the device to terminal blocks mounted on the controller.
 - .4 Provide a separate junction box, mounted on the side of the controller in the machine room, with terminals for the connection of "non elevator" devices, such as telephones, card reader interface and connect from the elevator controller to this junction box, as required.
 - .5 The conductors from the controller to the hoistway door locks shall meet the requirements of Rule 2-126 and Clause 38-011 of the Canadian and Ontario Electrical Safety Codes. The wiring must be rated for 200 centigrade and be of the SF type or equivalent.
 - .6 Provide ten percent (10%) additional minimum spare wires.
 - .7 Check all wires, including spares, for continuity and grounds, and mark each wire by a number and each group as to destination.
 - .8 Mark all connections on intermediate terminal blocks with corresponding numbers.
 - .9 Where provided ensure all flexible conduit is aluminum type.
 - .10 Mark all individual wires by numbered adhesive waterproof markers.
 - .11 Identify wires of multi-wire cables by colour code.
 - .12 Label all terminal and junction boxes as to their function with permanently attached waterproof labels.
 - .13 Label group of wires and multi-wire cables and mark all terminals with waterproof markers.
-

Wiring, Conduit and Fittings - cont'd

- .14 Provide stranded field wire with no splices.
- .15 Attach to each controller a legible list, neat and waterproof, showing wiring runs, colour codes, and numerical codes.
- .16 Do not use armoured flexible metal conduit as grounding conductor. Provide a separate ground wire in all flexible metal conduit where grounding is required.
- .17 Limit the use of flexible conduit on the car top to items that require movement or periodic adjustment. Excessive use of flexible conduit will be rejected.
- .18 Provide a separate identified green ground wire to all switches and components connected by flexible conduit, such as, but not limited to, hoistway door locks, car gate switch, hall and car push buttons and limit switches.
- .19 All flexible conduit that rests on the car top must be installed in a uni-strut which is at least the same height as the conduit.
- .20 All grounding or bonding conductors shall have a continuous outer finish that is green or green with one or more yellow stripes.

2.3 Travelling Cables

- .1 Provide new flexible travelling cable designed specifically for elevator use.
- .2 Terminate cables on terminal blocks having identifying numbers to facilitate replacement and service.
- .3 Provide travelling cable with flame retarding and moisture resisting outer covers.
- .4 Suitably suspend the travelling cables to relieve strain in the individual conductors, (using a steel supporting strand with appropriate supports if the suspended weight exceeds 34 kg).
- .5 Provide ten percent (10%) additional minimum spare wires in each travelling cable.
- .6 Provide in the travelling cables, at least five (5) pairs, shielded wires for audio, video or other electronic equipment.

2.4 Sound Isolation

- .1 Provide sound isolation with resilient pads to effectively isolate the machine from the machine beams and flooring.
 - .2 Prevent lateral displacement of machine.
-

2.5 Lubrication

- .1 Include means of lubricating bearings, requiring periodic lubrication.
- .2 When used, provide all grease fittings to fit same gun.
- .3 Provide visible and easily accessible lubrication points.

2.6 Guide Shoes

- .1 Retain and reuse the existing guide shoes.
- .2 Refurbish the guides to new condition.

2.7 Suspension Ropes and Fastenings

- .1 Provide new steel wire rope constructed for elevator service, for the suspension of the elevator car and counterweight.
- .2 Ropes installed on the elevator, shall be from the same factory production run.
- .3 Provide as a minimum, individual compression springs on counterweight dead end to equalize tension in ropes.
- .4 Provide minimum 9mm diameter metal anti-rotation devices to secure all terminations after installation to prevent rotation of fastenings in hitch plates.
- .5 Provide approved type wedge socket wire rope fastenings.
- .6 The returned end of the wire ropes on wedge clamp fastenings are to be secured with two (2) retaining clips. The first clip is to be set approximately 50 mm above the top of the wedge clamp, the second clip at 100 mm above the first clip. The end of the wire rope is to be bound and tied or taped to prevent injury.

2.8 Guide Rails and Fastenings

- .1 Retain existing car and counterweight rails. Thoroughly clean down all rails and brackets.
 - .2 Check all fastenings, brackets and fish plates to ensure secure and solid attachment of rails to brackets.
 - .3 Paint car and counterweight rails and brackets as per Section 09 91 23.01
-

2.9 Spring Buffers

- .1 Retain and reuse existing spring buffers.
- .2 Do not compress buffers when car is level with bottom landing.
- .3 Thoroughly wire brush and paint all pit steel black in colour as per Section 09 91 23.01

2.10 Buffer Extension and Supports

- .1 Provide where necessary all extension, reinforcement, support brackets, working platform and ladders to suit pit depth according to Code Requirement.

2.11 Counterweight

- .1 Retain and reuse the existing counterweight frame and bricks.
- .2 Balance counterweight to equal the weight of the complete elevator car cab, frame and platform plus 40 to 42.5% of the contract load.
- .3 Check runby and post sign in the vicinity of the counterweight buffer indicating the maximum designed runby for this installation.
- .4 Statically balance the counterweight so that when the counterweight is at the centre of the hoistway it will hang in the centre of the rails with the top guides removed.
- .5 Provide blocking under counterweight, where required.

2.12 Car Safety

- .1 Retain the existing under car safety device. Check safety device for operation in accordance with clause 2.17 of the CSA-B44 Safety Code For Elevators
- .2 Perform full load overspeed test in the presence of the Departmental Representative.

2.13 Top of Car Inspection Operation

- .1 Provide new Top-of-Car Inspection operation with open door circuits in accordance with clause 2.26.1.4.2 of the CSA-B44 Safety Code For Elevators.

2.14 Car Overspeed Protection

- .1 Provide means to prevent a car from Overspeeding in the ascending direction of travel in accordance with clause 2.19.1 of the CSA-B44 Safety Code For Elevators. Include all materials and labour required, either for or as a result of the mounting and installation of the device.
-

Car Overspeed Protection - cont'd

- .2 Detect any uncontrolled movement of the car prior to or, at a minimum, at the time when the car reaches a predetermined overspeed, and cause the car to stop prior to the time when the counterweight strikes its buffers, or at least reduce the car speed to the speed for which the buffer is designed.
- .3 Device to be capable of performing as required without assistance from any elevator component that solely, without built-on redundancy, controls the speed, or deceleration, or stops the car during normal operation.
- .4 Device required to perform this function must apply pressure to the hoisting ropes not the drive sheave.

2.15 Car Uncontrolled Low Speed Protection

- .1 Provide means to prevent any uncontrolled movement of the car in accordance with clause 2.19.2 of the CSA-B44 Safety Code For Elevators
- .2 Detect any uncontrolled movement of the car before the car travels away from the landing by more than 500mm and bring the car to a full stop before it travels an additional 750mm.
- .3 Device to be capable of performing as required without assistance from any elevator component that solely, without built-on redundancy, controls the speed, or deceleration, or stops the car during normal operation within the levelling zone
- .4 Device required to perform this function must apply pressure to the hoisting ropes not the drive sheave.

2.16 Car Overspeed Governor

- .1 Provide new overspeed governor and wire rope designed to suit existing speed and capacity of elevator.
- .2 Provide new governor tension sheave in pit.
- .3 Calibration of the new governor shall be checked in the presence of the Departmental Representative.

2.17 Geared Traction Machine

- .1 Remove the existing machine and install a complete new machine.
 - .2 Provide traction type single wrap geared machine with 2:1 roping arrangement.
 - .3 Geared machine to consist of an AC motor, electromechanical brake, steel worm, bronze gear, steel sheave shaft and traction sheave mounted in proper alignment on a suitable bed-plate.
-

Geared Traction Machine - cont'd

- .4 Provide reversible AC motor with high starting torque and moderate starting current, specifically designed to meet the severe loads encountered in elevator service. Provide motor with a slip specification of 5% or less, or a NEMA rating of "A" or "B".
- .5 Provide not less than one (1) megohm insulation resistance between motor windings and motor frame.
- .6 Worm to be manufactured from annealed or stress relieved steel, accurately machined, ground and provided with a single end, double race and ball bearing thrust. Gear to be manufactured from a phosphor bronze rim, accurately cut, fitted and bolted to a cast iron spider.
- .7 Design to permit removal of thrust unit without dismantling machine.
- .8 Include means for lubrication and provide oil tight inspection ports for worm gear face, gear contact and gear mounting bolts.
- .9 Fabricate traction sheave from mehanite cast iron properly grooved for the cables and demountable from the gear sheave spider.
- .10 Design brake to be spring applied, electromagnetically released and quietly operated by direct current. Design and adjust for holding the car cab with 125% of the rated load. Impregnate winding with insulation and bake to prevent absorption of moisture and oil.
- .11 Design and adjust the machine so that when running at contract speed, vibrations shall not exceed a reading in excess of 0.3 mm taken at the end of the drive motor. The total back lash of the gear and the end play of the worm shall not exceed 0.178 mm as measured with balanced load plus 90 kg and balanced load minus 90 kg.
- .12 Provide hoist cable oilers.

2.18 Sheaves

- .1 Retain and refurbish existing sheaves.
- .2 Examine supporting beams and fastenings. Refurbish to new condition.
- .3 Provide metal guards for two to one sheaves on car and counterweight.

2.19 Limit Switches

- .1 Replace all slowdown and final limit switches with new switches.
- .2 Dowel final limits to brackets after final adjustment.

2.20 Direct Current Supply

- .1 Provide rectifiers to supply direct current for elevator machine brake, control and operating equipment.
-

2.21 Variable Voltage Variable Frequency Control

- .1 Provide a variable voltage variable frequency, flux vector control system designed for a three phase AC induction motor. System to be capable of producing full torque at zero speed and shall utilize a shaft mounted position transducer to accurately measure the rotating frequency.
 - .2 Provide closed loop tachometer feedback control. Continuously monitor the elevator speed signal from the 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.
 - .3 Provide stepless acceleration and deceleration and smooth operation at all speeds.
 - .4 Use a three-phase, full wave bridge rectifier and capacitor bank to provide a DC voltage bus for the solid-state inverter.
 - .5 Use power semiconductor devices and pulse width modulation, with a carrier frequency of not less than 10 kHz, to synthesize the three-phase, variable voltage variable frequency output to operate the hoist motor in an essentially synchronous mode.
 - .6 The drive shall not create excessive audible noise in the elevator motor.
 - .7 Provide 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 hoist motor. A.C. motor to have a slip specification of 5% or less, or a NEMA rating of "A" or "B".
 - .8 Provide a heavy duty type drive, capable of delivering sufficient current required to accelerate the elevator to contract speed with rated load and be able to maintain a 180% to 200% current overload for 3 seconds and a 150% current overload for 60 seconds. Equip drive with an electronic automatic stall prevention and voltage boost to prevent nuisance tripping during load or line transient conditions.
 - .9 Provide means for removing regenerated power from the drive's DC power supply during dynamic braking. This power shall be dissipated in a resistor bank, which shall be 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.
 - .10 Provide a contactor to disconnect the hoist motor from the output of the drive unit each time the elevator stops. Monitor contactor to ensure that the elevator will not restart if the contactor has not returned to the de-energized position when the elevator stopped.
 - .11 Open all power feed lines to the brake by an electro-mechanical switch. A single ground, short circuit or solid-state control failure shall not prevent the application of the brake.
 - .12 Arrange to continuously monitor the performance of the elevator in such a way that if the car speed exceeds 0.75 m/s during inspection operation or levelling, the car shall shut down immediately. Provide manual resetting.
-

Variable Voltage Variable Frequency Control - cont'd

- .13 The system shall not require DC injection braking to control the stopping of the elevator.
- .14 Provide encoder feedback to regulate hoist motor speed. Mount encoder on the motor shaft.
- .15 Provide a multi-functional diagnostic display in each drive. Display the following as a minimum:
 - .1 Line power loss
 - .2 Instantaneous over current
 - .3 Ground fault
 - .4 Over voltage
 - .5 Under voltage
 - .6 Regeneration overload
 - .7 High temperature, both motor and control
 - .8 Circuit defect in drive unit
 - .9 Loss of motor field
 - .10 Soft start fault
 - .11 Torque proving fault
 - .12 Over speed
 - .13 Faulty phase
 - .14 Open brake resistance
 - .15 Amperage

2.22 Automatic Self-Levelling Feature

- .1 Provide self-levelling device which will automatically bring car to within 6.35mm or better, above or below the landing sill.
- .2 Compensate for overtravel or undertravel and bring car level to landing sill.

2.23 Controllers and Cabinets

- .1 Enclose controller in enameled ventilated sheet cabinet. Provide hinged doors for easy access.
 - .2 Provide contacts to insure maximum conductivity with a wiping action to prevent sticking and fusion.
 - .3 Provide electronic time delay devices which employ stable capacitors or crystals as time base.
 - .4 Wiring on the controller, whether control or field wiring, must be done in neat, workman like order and all connections made to studs and terminals by means of wire lugs or similar connections.
 - .5 All relays, contactors, fuses and printed circuit board components, etc., shall be clearly marked by means of tags not easily removable.
-

2.24 Computing Devices

- .1 Isolate the inputs to micro-processors from external devices (such as push-buttons) and isolate the outputs to external devices (such as indicators) by means of relays or optical devices.
- .2 Provide the control program on read-only-memory with a minimum of 40% spare capacity, to allow for future programming modifications and extension.
- .3 Provide for separate regulated power supplies to serve each micro-processor system.

2.25 Selector

- .1 Provide a hoistway car position system, electrically coupled to the controller.
- .2 Design system to provide the controller with precise information as to the absolute position of the elevator within the hoistway.
- .3 Provide solid state devices, pulse generators, or magnetic switches, in combination with a fixed steel tape, for position and direction indication, speed reduction, levelling, door zone and related signals.
- .4 Do not use electro-mechanical stepper switches.
- .5 Design the unit so that the parts are readily accessible for replacement and adjustment.

2.26 Hoistway Switches

- .1 Hoistway switches shall be silent in their operation and inaudible to passengers in the car.

2.27 Solid-State Hardware

- .1 Mount solid-state devices, except for high power silicon controlled rectifiers, on removable printed circuit boards.
 - .2 Gold plate the contact points of edge connectors.
 - .3 Provide plated through holes for double sided boards.
 - .4 Make all connections to the printed circuits on the printed circuit boards by means of properly dimensioned pads.
 - .5 "Patched" connections will not be accepted.
 - .6 Design solid-state devices for a high level of noise immunity.
 - .7 Incorporate electrical noise suppression devices in the power supplies and the inputs and outputs associated with the solid-state circuits.
-

2.28 Control Circuit Grounding

- .1 Arrange the control circuits so that one side of the control power supply for external circuits is grounded to facilitate testing and trouble shooting.

2.29 Hoistway Door Frames and Sills

- .1 Retain existing hoist way door frames and sills.
- .2 Electrostatically paint frames with rust resistant enamel. Colour choice by Departmental Representative. Paint as per Section 09 91 23.01
- .3 Paint sills with black machinery paint as per Section 09 91 23.01

2.30 Hoistway Doors

- .1 Retain existing opening of 1727 mm wide and 2235mm high.
- .2 Provide new steel plate bi-parting counterbalanced hoistway doors, with vision panel in upper door section, Construct from 2.8mm plain steel with rigid steel framing. Provide flush appearance on landing side.
- .3 Factory finish doors with one prime coat of rust resistant paint and electrostatically paint on site with rust resistant enamel. Colour choice by Departmental Representative. Paint as per Section 09 91 23.01
- .4 Equip each door panel with four (4) solid precision grooved adjustable shoes.
- .5 Equip lower edge of the upper door section with asbestos neoprene fire resistive type non crushing member of 38mm thick minimum and top edge of lower door section with trucking sill designed to support the loading/class specified.

2.31 Hoistway Door Fire Rating

- .1 Doors shall be 1.5 hr. fire rated in conformity with NBC, produced under label service program of ULC or other agency acceptable to authorities having jurisdiction.
- .2 Affix ULC or other acceptable agency label on doors and accessories.

2.32 Hoistway Door Landing Identification

- .1 Paint 100mm numerals on hoistway side of hoistway doors to identify floor level.
-

2.33 Hoistway Access Device

- .1 Provide keyed hoistway access switches. Provide the switch for access to top of car and pit.
- .2 Locate switches adjacent to hall door frame and engrave "Hoistway Access" with direction arrows on face plate.
- .3 Provide access to hoistway at all floors by means of a releasing chain device which is kept under a locked panel.

2.34 Fascias

- .1 Provide fascias, as required, of no 1.9 mm sheet steel, rigidly fastened.

2.35 Hoistway Door Tracks, Hardware and Locks

- .1 Provide new removable steel door tracks with adjustable trucking sill stops, and dual side tension latching.
- .2 Install tracks vertically plumb and fasten with two bolts each, at floor level.
- .3 Provide an approved interlock, and motor operated retiring cam.
- .4 Connect door sections to each other with suitable roller chain running over grooved ball bearing sheaves. Connection to the upper panel to be with malleable iron connectors and to the lower panel with cold rolled square rods with adjustable connectors.

2.36 Car Gate and Tracks

- .1 Provide at the front of the cab, a new single section vertically sliding counter weighted steel gate constructed of 3.5mm with 38 mm diamond round wire mesh panels with channel steel frame and channel stiffeners on vertical centres.
 - .2 Provide solid type guide shoes made of cast iron or with brass alloy. Design guide shoes to provide easy replacement of the units when required.
 - .3 Guide on steel tracks and counterbalance by weights attached by roller chains with adjustable connectors running over ball bearing sheaves.
 - .4 Set steel tracks vertically plumb and secure with minimum 9.52 mm bolts spaced every 305 mm.
 - .5 Enclose or design counterweight to be retained should means of suspension fail.
 - .6 Provide approved type electric gate contact.
 - .7 Paint with one prime coat of rust resistant paint and finish with rust resistant neutral grey air-dry enamel. Paint as per Section 09 91 23.01
-

2.37 Power Door Operation

- .1 Provide for the car gate, and on one side of each hall door a two-speed door operator. Door travel shall be determined by direct drive limit switch actuation, motor speed to be controlled to minimize slam or rebound, and designed to insure full opening and full closing. An automatic stay-open feature shall be provided to assure that the hoistway door panels stay fully open.
- .2 Provide, an audible signal on the car to sound at least five (5) seconds prior to the time the car gate starts to close, and continues until the hoistway doors are substantially closed. Provide means to adjust the sound level of the signal to between 80 dBA and 160 dBA.
- .3 Automatically open doors when car is stopped level at the landing. Automatically close doors after last call.
- .4 Provide average closing speed of 0.3 m/s for each hoistway door panel and 0.6 m/s for car gate.
- .5 Provide average opening speed of no greater than 0.6 m/s and no less than 0.5 m/s.
- .6 Permit opening by hand in case of power failure.
- .7 Comply with clause 2.13.3.4 of the B44 Code.
- .8 At each landing furnish «momentary pressure open» button and «continuous pressure close» button in one fixture, so connected that doors cannot be operated unless car is at same landing.
- .9 Open door upon momentary pressure of «open» button and close door with continuous pressure of «close» button.

2.38 Infrared Sensor

- .1 Provide infrared sensor beams on each side of the car entrance.
- .2 Device to be reliable and consistent in operation, not affected by humidity or temperature changes and have inherent long term reliability with minimum maintenance.
- .3 Sensor devices shall operate as per clause 2.13.3.4.5 of the B44 Code.

2.39 Reduce Speed Door Closing

- .1 Should the doors be held open by the "Sensor Beam" for more than 20.0 seconds, or if there is a power loss to the "Sensor Beam" a buzzer shall sound and the door closing kinetic energy shall be reduced to 3.5 j.
-

2.40 Car Platform - C1 Loading Modifications

- .1 Retain the existing car platform. Modify the platform as described below.
- .2 Install under the platform, four (4) new full length 100mm X 5.4# channel stringers centered between the existing stringers.
- .3 Fasten the new stringers to the front and rear platform framing members with minimum 100mmX100mm X 12mm X 65mm long steel angle iron plates. Use 4 12mm diameter bolts to fasten each angle iron plate.
- .4 The angle iron plates shall be welded to the stringers before installation under the platform.
- .5 For ease of installation, the new stringers shall be cut in suitable lengths to be bolted to each other using 75mmX75 mmX12mm steel angles 250mm long and fastened with 4 X 12mm diameter bolts and lock nuts.
- .6 Fireproof the underside of the car platform as per B44 code requirements using 28 gauge sheet steel panels. The sheet steel should be installed prior to adding the new steel stringers.
- .7 Thoroughly clean and paint existing metal flooring with two coats of black machinery enamel as per Section 09 91 23.01

2.41 Car Frame

- .1 Retain the existing car frame.

2.42 Top of Car Operating Device

- .1 Provide top of car operating device, with an alarm bell designed to operate on normal and emergency power, duplex receptacle, and work light. Provide two (2) permanent guarded lights on car top. Provide lights on a raised support to provide adequate lighting at the rear of the car top.
- .2 Provide an **additional** portable hand held operating fixture. Provide a sufficient length of cord to ensure safe operation from all areas of the car top. Provide means to securely store the fixture on the car top when the unit is not in use. Paint the storage unit yellow in colour.

2.43 Top of Car Safety Railing

- .1 Provide a standard railing around the back and sides of the car top. Construct rail of steel tubing securely fastened to the perimeter of the cab and braced. Extend the railing from the crosshead towards the front of the hoistway on both sides. Do not interfere with running or overhead clearances. Paint railing yellow in colour.
 - .2 Railing to comply with clause 2.10.2 of B44 Code and TSSA Director's Ruling 245/10.
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2.44 Car Enclosure

- .1 Retain and refurbish existing cab interior.
- .2 Sand and prepare metal walls and ceiling for electrostatic painting.
- .3 Electrostatically paint the complete car enclosure.
- .4 Finish all surfaces, with two coats of rust inhibitive primer enamel. Finish in neutral grey enamel colour, as per Section 09 91 23.01.
- .5 Include two recessed 1220 mm long - two tube fluorescent electric light fixtures with T8 lamps and lamp guards flush with under side of car top. Provide guards for light bulbs.
- .6 Recess operating panels and other operating devices into enclosure.
- .7 Before painting cab, remove the existing metal plate and hooks on left side wall.
- .8 Provide a metal cover for the existing telephone cabinet. Paint cover same colour as cab walls.
- .9 Thoroughly sand and refurbish existing wooden truck rails. Refinish rails with clear varnish.

2.45 Car Operating Panel

- .1 Provide one recessed car operating panel with hinged stainless steel faceplate. Locate panel near car gate close to existing panel.
 - .2 Buttons to be of stainless steel, vandal resistant design. Provide tactile plates permanently attached by means of rivets or other approved fastenings to the left of each button; use international symbol for "Street Exit" level. All other markings to be engraved on the faceplate. Attached plates will not be accepted.
 - .3 The common devices to be included are as follows:
 - .1 Provide Stainless Steel vandal resistant floor push buttons with integral illumination using minimum 100,000 hour rated blue LED illuminators. Illuminate button when call is registered and extinguish the call when the car stops at the selected floor.
 - .2 Alarm, stop, door open, and door close buttons. Mark buttons with appropriate symbols. Provide a raised 15mm high stainless collar around the "Stop" button to prevent accidental activation. Spot weld collar to car operating panel.
 - .3 Lens for Emergency Lighting as specified elsewhere.
 - .4 Perforation holes for hands free communication system as specified elsewhere in these specifications. Mark the button with the international symbol for a telephone and the wording "PHONE".
-

Car Operating Panel - cont'd

- .4 The common devices to be included are as follows:
 - .1 Provide in the car operating panel, a digital car position indicator. Use LED type, 100,000 hour rating, on a high resolution screen display. Ensure bright and even illumination.
 - .2 Display letters and numbers at least 50 mm high.
 - .3 Letters and numbers to indicate the position corresponding to the landing through which the car is passing or at which it is stopped.
 - .4 Provide key switches, appropriately marked by wording or symbols, to control the following:
 - .1 Car Lights
 - .2 Test button for emergency lighting
 - .3 Independent service switch
 - .4 In-car Inspection Operation
- .5 Engrave the following on the operating panel.
 - .1 Elevator I. D. Number in minimum 50 mm numerals.
 - .2 Elevator Capacity in Kilograms
 - .3 TSSA Installation Number and Logo
 - .4 "Licence located in machine room" in letters 12mm in height. Engrave with black fill.
- .6 Visual and audible signal for Special Emergency Operation.
- .7 Submit samples of buttons and layout drawing to Departmental Representative for approval.
- .8 Contractor is not to order any material or start any manufacturing until all drawings and or samples are approved by the Departmental Representative.
- .9 Provide two freight loading signs as per 2.16.5 of the B44 Code.

2.46 Hall Buttons

- .1 Provide one riser of stainless steel vandal resistant hall buttons incorporating minimum 100,000 hour rated LED illuminators.
 - .2 Illuminate corresponding "Up" or "Down" call button when call is registered. Extinguish illumination when call has been answered.
 - .3 Provide door "Open" and door "Close" buttons so connected to operate only when car is stopped level at the floor where the buttons are located.
-

Hall Buttons - cont'd

- .4 Incorporate into the Lobby hall button station the key switch and LED pilot light as specified under "Firefighters Emergency Operation".
- .5 Provide an "out of service" indicator at each landing in the hall button fixtures. Indicator to illuminate any time service is denied to the hall buttons. Include an out of service toggle switch at the controller.
- .6 Provide in each hall button fixture a digital position indicator complete with direction arrows to indicate direction of travel of elevator.
- .7 Contractor is not to order any material or start any manufacturing until all drawings and or samples are approved by the Departmental Representative.

2.47 Special Hall Station At Designated Floor

- .1 Provide at the designated level floor a flush mounted Stainless Steel fixture containing the Fire Recall key switch with appropriate indicator lights.
- .2 The key switch shall be a three (3) position RESET - OFF - ON for the Fire Recall service. Provide quality type key switches of the Group 3 classification.
- .3 Provide at the designated level near the elevator hoistway an identified metal box containing the emergency recall keys.

2.48 Signal Illumination

- .1 Illuminate all letters and all numbers with sufficient intensity to produce distinct and well defined indication under ambient lighting conditions.

2.49 Faceplate Fastenings

- .1 Fasten all signal fixture face plates securely with unexposed fasteners or with tamper-proof fasteners.

2.50 Car Emergency Lighting

- .1 Provide battery operated emergency lighting equipment.
 - .2 Mount power pack on car top and light fixture in car station. Provide general illumination in the car with a minimum of 50 Lx intensity 1200 mm above the car floor and 300 mm in front of the operating panel for at least a four (4) hour period.
 - .3 Include means for convenient manual operation and testing of the unit in the car station. Arrange test switch to turn off normal lighting when testing emergency lighting.
-

2.51 Emergency Communications System In the Car

- .1 Comply with clause 2.27.1.1.1 of the B44 Code.
 - .2 Provide a hands free, vandal resistant, emergency communications device containing an internal adjustable volume control speaker and microphone, to enable two-way voice communication between the car and a location in the building that is readily accessible to authorized and emergency personnel.
 - .3 The device shall be activated by pressing the PHONE button located in the car station and shall automatically ring a telephone number of the Departmental Representative's choice. Once activated in the elevator the line shall remain open until disconnected by the receiver.
 - .4 Provide an LED and engraving to visually indicate that the call has been answered. Provide beside the PHONE button, an International Telephone Symbol as per E-11.2 the B44 Code and the operating instructions. "PHONE" button to be installed at 1220mm above the floor.
 - .5 The line dialler network shall operate on any central office line along with conventional phones and shall have an internal battery for memory back-up for a minimum of two years in the event that power fails or the dialler is removed from the telephone line.
 - .6 The device shall contain a ring sensor which shall allow the initiation of a call to the elevator. The number of rings shall be adjustable. The two-way communication shall not be transmitted to an automatic answering system.
 - .7 The two-way communications, once established, shall be disconnected only when authorized personnel outside the car terminate the call.
 - .8 The two-way communications means shall provide on demand to authorized personnel, information that identifies the building location and elevator number and that assistance is required.
 - .9 Provide all wiring necessary for the complete installation of the system from the device in the elevator to an externally located terminal in the elevator machine room. Connect to the telephone line. Contractor is responsible to ensure that the communication system functions as required including any work necessary to the building elevator phone line.
 - .10 The two-way communications means shall not use a handset in the car.
 - .11 If the emergency communication means is connected to the building power supply, it shall automatically transfer to a source of standby or emergency power as required by the applicable building code, after the normal power fails. The power source shall be capable of providing for illumination of the visual indication within the car, and the means of emergency communications for at least 4 hours; and the audible signaling device for at least 1 hour.
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2.52 Emergency Communications System In the Car Verification

- .1 Comply with Clause 2.27.1.1.6 of the B44 Code
- .2 Provide a minimum of one illuminated visual and audible signal for each group of elevators controlled by the Fire Recall Switch.
- .3 The visual signal is to be located at the designated landing in the vicinity of the Fire Recall Switch. Provide stainless steel faceplate.
- .4 Provide all Bilingual engraving as required.

2.53 Bilingual Markings

- .1 Engrave identification and instructions at least 0.25 mm deep on operating panels and on all signal equipment in both English and French except where design is such that inference is obvious and readily understood.
- .2 All car and hall position indicators to display bilingual identification matching bilingual car operating buttons.

2.54 Keys

- .1 Provide three (3) sets for each control device and four (4) sets of keys for Special Emergency Service.
 - .2 Organize keys on suitable key rings with permanently engraved tags, clearly identifying use. Tags to be approved by Departmental Representative.
-

PART 3 - EXECUTION

3.1 Workmanship

- .1 Install all equipment in a first class workmanship manner. Upon completion do all necessary repairs, cleaning, and painting as required to turn the equipment over in "New Condition".

3.2 Procedure

- .1 Remove one set of hoistway doors at a time only.
- .2 Install new hoistway doors from the existing elevator.
- .3 Ensure that all hoistway doors remain closed and locked during construction.
- .4 Provide permanently fastened solid barricades at each floor where work is being carried out.

3.3 Arrangement of Equipment

- .1 Arrange equipment in machine room so that the machine and controllers, and other equipment can be removed for repairs or replacement without dismantling or removing other equipment components.
- .2 Arrange equipment for clear passage.
- .3 Arrange equipment according to elevator shop drawings.
- .4 Accommodate equipment in provided space according to above mentioned requirements.

3.4 Welding

- .1 All welds shall be identified with the welder's identification stamp.
- .2 Field welding and cutting is not permitted.

3.5 Pit Equipment Arrangement

- .1 Arrange the pit equipment for convenient access and maintenance.

3.6 Erection of Hoistway Doors

- .1 Set hoistway doors in perfect alignment with car door and in true plumb with car guide rails.
 - .2 Erect hoistway doors in accordance with labeling requirements.
 - .3 Securely fasten frames to structural supports.
-

3.7 Surface Protection

- .1 Provide protective coverings for finished surfaces.

3.8 Limit Switches

- .1 Subsequent to the performance of safety tests and checks by the Inspecting Authorities, fasten final limit switches and brackets by through bolting or doweling.

3.9 Brake

- .1 Adjust brake to hold car cab plus 125% of the rated load.
- .2 After final adjustment of the brake and subsequent to the performance of safety tests and checks by the Inspecting Authorities, drill the brake spring nuts and rod and insert a cotter pin or seal to avoid incorrect or different adjustments in the future
- .3 Arrange the brake to stop the elevator with full load in the car from full speed in the down direction within the normal stopping distance of the car.

3.10 Car Balance

- .1 Check the static balance of the car.

3.11 Counterweight Balance

- .1 Check the static balance of the counterweight.
- .2 Check and adjust as required to ensure that the counterweight is equal to the complete elevator cab plus between 40 to 42.5% of the contract load.

3.12 Speed Variation

- .1 Adjust for speed variation as follows:
 - .1 When lifting rated load, do not permit car speed to vary from rated speed by more than 2%.
 - .2 When operating under varying normal conditions, i.e. rated load to no load, do not permit operating conditions to exceed 2%.

3.13 Operating Time

- .1 Adjust the equipment so that the elapsed time to travel one typical floor does not exceed 17.0 seconds in both directions.
 - .2 Measure this time as follows:
 - .1 The time starts when the doors are fully closed and continues until the car is stopped level with the next floor.
-

Operating Time - cont'd

- .2 Floor level is considered to be within 6.35 mm of level.
- .3 The time is measured with full load in the car and in both directions of travel.
- .4 Adjust the equipment so that for other conditions of loading, the time does not vary more than five percent (5%).
- .5 Adjust the equipment so that the operating time, as set out above, is compatible with dependable, consistent operation without undue wear or excessive maintenance and can be readily maintained over the life of the elevator installation.
- .6 Adjust the equipment so that with the control adjusted to give the required time, the elevator operates under smooth acceleration and retardation and provides a comfortable and agreeable ride to the operator.

3.14 Ride Performance

- .1 Acceleration/Deceleration
 - .1 Adjust the equipment to allow the car to start, accelerate, decelerate and stop smoothly.

3.15 Inspections Field Tests and Commissioning

- .1 Furnish a competent personnel to assist the Departmental Representative during the inspection and testing of the systems. Make the appropriate corrections until final acceptance of the installations.
 - .2 The inspections will be carried out to ensure that the workmanship is in compliance with plans and specifications.
 - .3 Provide a minimum of ten working days notice to Departmental Representative for testing. Prior to giving notice the contractor shall test all systems to ensure proper operation.
 - .4 Perform all tests as required by the B44 Safety Code For Elevators and the Technical Standards and Safety Act 2000, O.Reg. 209/01.
 - .5 In addition, upon completion of the elevator supply all personnel, instruments and devices required to perform the following:
 - .1 Test car and counterweight balance to verify specification requirements.
 - .2 Test the equipment under full load and no load to verify the speed variation performance requirements.
 - .3 Test door operating equipment to verify the performance requirements.
-

Inspections Field Tests and Commissioning - cont'd

- .4 Test the ride to verify the performance requirements.
- .5 Test overload relays
- .6 Perform all electrical readings and complete technical data forms required by the specifications.
- .7 Upon completion of the elevator, furnish competent technicians and adjusters fully trained on the equipment installed to check and test all operating systems including but not limited to, special emergency service.

3.16 Cleaning and Painting

- .1 Upon completion thoroughly clean, remove all indications of rust and paint the following:
 - .1 Machine room equipment in Urethane Reinforced Enamel paint. Colour to be submitted to Departmental Representative for approval.
 - .2 Machine room floor Urethane Reinforced Floor Enamel to match Moore Paint colour Platinum Grey #112-74.
 - .3 Horizontal area of the refuge space on the car top in a contrasting Yellow colour.
 - .4 Car top and crosshead in rust resistant black paint.
 - .5 Car toe guard and steel channel behind toe guard black in colour.
 - .6 Counterweight frame and blocks in rust resistant yellow paint.
 - .7 Pit equipment, channels, and buffer supports in rust resistant black paint.
 - .8 Horizontal area of the refuge space in the pit in a contrasting yellow colour.
 - .9 All hoistway structural steel provided by this Section in rust resistant black paint.

3.1 Test Data Forms

- .1 After completion of the test, complete and submit test data forms to Departmental Representative.
 - .2 These forms shall be signed by the person responsible for the performance of the work.
 - .3 Include a check list of all performance data such as speed, door times, operating times, flight times, and all settings of any adjustable device.
 - .4 Provide copies of all TSSA Inspection Forms and Test Data Reports.
-

Test Data Form - cont'd

Elevator No.	
CAR SPEED UP (fpm)	
CAR SPEED DOWN (fpm)	
FLOOR TO FLOOR TIME UP (seconds)	
FLOOR TO FLOOR TIME DOWN (seconds)	
BRAKE TO BRAKE TIME UP (seconds)	
BRAKE TO BRAKE TIME DOWN (seconds)	
EMPTY CAR - RUNNING CURRENT UP (amps)	
EMPTY CAR - RUNNING CURRENT DOWN (amps)	
FULL LOAD - RUNNING CURRENT UP (amps)	
FULL LOAD - RUNNING CURRENT DOWN (amps)	
CAR DOOR OPEN TIME (seconds)	
CAR DOOR CLOSE TIME (seconds)	
NUDGING TIME OUT (seconds)	
DOOR CLOSING STALL FORCE (lbs)	
LEVELLING ACCURACY (")	
TYPE OF DOORS	
SAFETY SLIDE DISTANCE (inches)	
GOVERNOR OVERSPEED SWITCH TRIP (fpm)	
SAFETY APPLICATION TRIP SPEED (fpm)	
CAR CAB NOISE LEVEL - CAR RUNNING - FAN OFF	
TESTS PERFORMED BY:	DATE:

- .5 These forms shall be signed by the person responsible for the performance of the work.

End of Section

PART 1 - GENERAL

1.1 Related Sections for Health Protection Building - Passenger Elevator No. 2

- .1 Section 01 00 10 - General Instructions
- .2 Section 01 14 25 - Designated Substances Report
- .3 Section 01 35 29.06 - Health and Safety
- .4 Section 01 91 13 - General Commissioning Requirements
- .5 Section 09 91 23.01 - Interior Re-painting
- .6 Section 21 05 01 - Common Work Results - Mechanical
- .7 Section 26 05 00 - Common Work Results - Electrical
- .8 Section 28 31 00.01 - Fire Alarm Systems

1.2 Description of Work

- .1 This section covers the complete removal of the existing freight elevator #2, and the design, engineering, fabrication, manufacture, installation, and inspection of One (1) new Geared Overhead Traction Service /Passenger Elevator designed for Class C3 Loading, located in the Health Protection Building at Tunneys Pasture. All work must be carried out between the hours of 5:00 PM and 6:00 AM Monday to Friday. A start time of 8:00 AM is acceptable for any weekend work required.
 - .2 All equipment to be designed to meet the space provisions as per site conditions.
 - .3 Provide all materials, labour, design, manufacturing, inspection, and testing as required to complete the work as specified in these Contract Documents.
 - .4 Arrange and pay for all permits, certificates, inspections and tests required by the governing authorities, including the Initial TSSA inspection and subsequent inspections and the initial Operating Licence on new installations or modernized elevators.
 - .5 Where a device or component is mentioned in the singular number, such references shall be understood to mean that the Contractor shall provide as many of said devices or components as is necessary for the completion of the elevator covered under this Specification.
 - .6 All equipment being replaced shall become the property of the Contractor, and as such, it is the responsibility of the Contractor to remove it from the premises in a prompt and orderly manner.
-

1.3 Description of Systems

- .1 The characteristics of the **new** Service Passenger elevator are as follows:
 - .1 Classification: Passenger Designed for Class C3 Loading
 - .2 Rated Net Capacity: 1818kg.
 - .3 Rated Speed: .76 m/s.
 - .4 Travel: From B floor to the 2nd floor, a distance of approx. 7.7m
 - .5 No. of Stops: Three (3)
 - .6 No. of Openings: Three (3) front
 - .7 Entrance Type: Centre Opening
 - .8 Entrance Size: 1066mm wide x 2134mm high
 - .9 Hoistway: Existing 3454mm wide x 3048mm deep
 - .10 Pit: Existing 1371mm deep
 - .11 Overhead: Existing 3962 mm to underside of machine beams

**ELEVATOR CONTRACTOR TO CONFIRM
ALL INFORMATION, MEASUREMENTS and FLOOR MARKINGS ON SITE**

1.4 Related Work by Elevator Contractor

- .1 Include all related building work required to complete the replacement of the freight elevator. Include the following as a minimum.
 - .1 **Machine Room**
 - .1 Patch flush to the floor with cement, all redundant holes in machine room floor resulting from the removal of the redundant elevator equipment.
 - .2 Provide a removable metal guard around the drive sheave and hoist ropes.
 - .3 Provide a licence frame holder for the elevator licence to be installed on the front of the controller door. Indicate on TSSA design submission that licence will be located in the elevator machine room.

Related Work by Elevator Contractor - cont'd

.2 Car Top

- .1 Paint the elevator and installation numbers on the crosshead.
- .2 Provide two permanently connected guarded lights on car top. One light to be a hand held type with magnetic base.
- .3 Provide a metal safety railing on the car top to B44 code requirements and TSSA Director's Ruling 245/10.
- .4 Provide removable metal guards for all sheaves on car top. Paint guards yellow as per Section 09 91 23.01

.3 Hoistway

- .1 Thoroughly clean down hoistway at completion of work. Complete all painting as specified in Part 3 - Cleaning and Painting.
- .2 Electrostatically paint all hoistway doors and frames. Colour choice by Departmental Representative. Paint as per Section 09 91 23.01
- .3 Run all telephone, communication, elevator security and fire alarm lines and conduit in the hoistway to machine room. Others will run lines to the hoistway and provide sufficient wiring to reach machine room. Elevator Contractor to supply the conduit in the hoistway. All fire alarm wiring must be run in a separate conduit.
- .4 Remove all redundant elevator related electrical wiring and piping from the hoistway.

.4 Pit

- .1 Paint all equipment in the pit including the floor as per section 09 91 23.01
 - .2 Extend pit ladder to 1524mm above floor. Paint pit ladder Yellow in colour as per section 09 91 23.01
 - .3 Provide new fused or knife type disconnect switch in pit. Provide auxiliary disconnect switch located near top of ladder. Provide switches red in colour, identify stop and run positions.
-

1.5 Machine and Overspeed Governor Guarding

- .1 Provide a removable metal guard around the machine as required by Section 24, 25, 75 and 76 of the OHSa requirements and CSA Standard Z432-04 - Safe Guarding of Machinery. Paint Guard Yellow.
- .2 Provide a removable metal guard around the overspeed governor. Use 9mm expanded metal for the enclosure. Paint guard yellow.
- .3 Securely fasten the overspeed guard to the floor with 6mm bolts.

1.6 On Site Documentation Required

- .1 **Before** any work commences on site, provide the following information and leave it in the machine room until the completion of the project.
- .2 A complete copy of the elevator specifications.
- .3 A copy of the Contractor's "lock out and tag out" procedures.
- .4 A copy of the Contractor's "accident prevention and safety policy" or a copy of the "elevator industry field employees' safety handbook".

1.7 Reference Standards

- .1 Comply with all building codes, by-laws, regulations, directives, and ordinances as set forth and mandated by Federal, Provincial, and Municipal Authorities, in effect at the time of installation.
 - .2 The following Standards as a minimum shall apply:
 - .1 ASME A17.1-2010/CSA-B44-10 Safety Code For Elevators, including latest supplements and Appendix E, Elevator Requirements For Persons with Physical Disabilities.
 - .2 The latest copy of the TSSA Code Adoption Document.
 - .3 B44.2.07 - Maintenance requirements and intervals for elevators, dumbwaiters, escalators and moving walks.
 - .4 CSA Standard B651-04 Accessible Design For The Built Environment.
 - .5 The National Building Code Of Canada - 2005.
 - .6 CAN/CSA-B44.1- 11/ASME A17.5 2011 Elevator and Escalator Electrical Equipment.
 - .7 CSA Standard C22.1-09 Canadian Electrical Code Part 1.
 - .8 Technical Standards And Safety Act, 2000 O.Reg 209/01.
-

Reference Standards - cont'd

- .9 EN 12016-1998 Electromagnetic Compatibility-Product Family Standards for Lifts, Escalator and Passenger Conveyers Part 2-Immunity.
- .10 Occupational Health and Safety Act and Regulations for Construction Projects O.Reg.213/91 as amended by O.Reg. 631/94. R.R.O. 1990 Reg. 834.
- .11 CSA Standard Z432-04 - Safe Guarding of Machinery.
- .12 Occupational Health and Safety Act and Regulations for Industrial Establishments R.R.O. 1990 Reg. 851. S 24 & 25

1.8 Definitions of Terms

- .1 The term Owner, as used herein, refers to: PWGSC.
 - .2 The term Departmental Representative, as used herein, refers to an agent of the Owner, empowered to interpret drawings and specifications relating to the elevator equipment and systems.
 - .3 The term Professional Engineer, as used herein, refers to: A Professional Engineer registered in the Province of Ontario.
 - .4 The term elevator Contractor or Contractor, as used herein, refers to any person, partners, firm or corporation having a contract with the owner to furnish labour and materials for the execution of the work herein described.
 - .5 The term sub-contractor, as used herein, refers to any person, partners, firm or corporation having a contract with the contractor to furnish labour and materials for the execution of the work herein described.
 - .6 The term "refurbish", shall mean to carry out all labour, painting or modifications to parts, etc, which will result in returning the original component to a "like new" condition. All refurbished equipment must be acceptable to the Departmental Representative
 - .7 The term Electrical Safety Authority, as used herein, refers to: The Electrical Inspection Authority in the Province of Ontario.
 - .8 Where the terms "furnish" or "provide" are used, it shall mean to supply and install new equipment.
 - .9 All terms in the specifications that are not otherwise defined shall have the definitions as given in the latest edition of the CSA-B44 Safety Code For Elevators.
-

1.9 Simplex Selective Collective Automatic Operation

- .1 Provide a micro-processor based selective collective control system.
- .2 Dispatch car to corresponding landing upon momentary pressure of car or hall call buttons.
- .3 Provide separate time delays for car and hall calls to enable passengers to enter or leave the car. Hold car for preset interval at landings where stops are made. Time delays to be adjustable from 0 to 15 seconds. Cancel interval upon registration of car call or pressure on door close button.
- .4 Stop car at landings for which car calls are registered. Make stops in order in which landings are reached, regardless of sequence in which buttons are registered
- .5 If no car buttons are registered and car starts UP in response to several DOWN calls, proceed to highest DOWN call and reverse to answer other DOWN calls. Similarly, when car starts DOWN in response to several UP calls proceed to lowest UP call, and reverse to answer other UP calls.
- .6 If the car stops for a hall call and a car call is registered corresponding to the direction the car was travelling, proceed in same direction regardless of other registered landing calls.
- .7 If DOWN hall calls are registered while car is travelling UP, do not stop for these calls but allow calls to remain registered.
- .8 After highest car and hall calls have been answered, reverse car automatically and respond to DOWN car and hall calls.
- .9 When no hall or car calls have been registered for a period of sixty (60) seconds return elevator to the bottom landing and park with doors closed.

1.10 Firefighters' Emergency Operation

- .1 Provide Automatic "Firefighters' Emergency Operation" in accordance with Clause 2.27.3 of the CSA-B44 Elevator Safety Code and the National Building Code of Canada.
 - .2 When required, an additional key-operated "FIRE RECALL" switch with two positions marked "OFF" and "ON" in that order, shall be permitted at "Building Fire Control Station" only.
-

1.11 Fire Operation Panel

- .1 The "FIRE OPERATION" switch, the "CALL CANCEL" button, the "STOP" switch, the door open button(s), the door close button(s), the additional visual signal and the operating instructions shall be grouped together at the top of a main car operating panel behind a locked cover.
- .2 The firefighters' operation panel cover shall be openable by the same key that operates the "FIRE OPERATION" switch. The cover shall be permitted to open automatically when the car is on Phase I Emergency Recall Operation and at the recall level.
- .3 When the key is in the "FIRE OPERATION" switch, the cover shall not be capable of being closed. When closed, the cover shall be self-locking. Where rear doors are provided, buttons for both the front and rear doors shall be provided in the firefighters' operation panel. The door open and door close buttons for the rear entrance shall be labelled "OPEN REAR" and "CLOSE REAR."
- .4 All buttons and switches shall be readily accessible, located not more than 1800 mm above the floor. The front of the cover shall contain the words "FIREFIGHTERS' OPERATION" in red letters at least 10 mm high.

1.12 Firefighters' Operation Instructions

- .1 Instructions for the operation of the elevator on Phase I Emergency Recall shall be permanently incorporated with, or adjacent to the "FIRE RECALL" switch at the designated level.
- .2 Instructions for the operation of the elevators on Phase II Emergency In-Car Operation shall be permanently incorporated on the rear of the fire panel door in the car.
- .3 The instructions shall be in letters not less than 3mm in height and shall be permanently installed and protected against removal or defacement.

1.13 Firefighters' Emergency Operation Key - FEO-K1

- .1 Provide a standard TSSA acceptable firefighters' operation key (FEO-K1).
 - .2 The key shall be of a tubular type, 7-pin, style 137 construction and have a biting code of 6143521 starting at the tab sequenced clockwise as viewed from the barrel end of the key.
 - .3 The same FEO-K1 key shall operate the elevator emergency power selector switch when provided, the fire recall switch and fire operation panel door.
 - .4 The key switches shall comply with Clause 2.27.8 and be of the Group 3 Security.
-

1.14 Identification

- .1 Provide 50mm numerals on all elevator equipment as previously specified. Include permanent numbers engraved in the elevator.
- .2 Provide all necessary engraving on faceplates as required by the Departmental Representative in English and French, Helvetica medium, upper and lower case.
- .3 All fastenings of cover plates for signals, buttons and panels shall be tamper proof type.
- .4 Identify the elevator at recall level. Use metal plates permanently installed with rivets or a permanent type glue. Numbers to be minimum 50mm high.
- .5 Provide raised character and braille floor designations on both door jambs minimum 50mm. Locate centre-line of numeral 1525 mm above floor level measured from the base line of the characters.
- .6 At the main entry level on both door jambs provide a 50mm raised star designation to the left of the floor designation number. All characters to comply with Clause E-17.
- .7 Provide at each floor, bilingual, Elevator Corridor Call Station Pictograph as per Figure 2.27.9 of CSA-B44 Code.
- .8 Stencil and paint floor numbers, not less than 100mm in height, on the fascia and inside of the hoistway doors

1.15 Independent Service Operation

- .1 Provide independent service operation by means of a key operated switch in car to allow the car to operate independently in response to car calls only.
- .2 Park the car with the doors open, and respond to a selected car call by constant pressure on the door close button, provided, that the doors have been closed and the interlock is made-up. Arrange for the doors to reopen if the constant pressure on the door close button is released at any point prior to the car starting.
- .3 Place the direction of travel under the control of the attendant. Arrange the operation to cancel all registered car calls, and by-pass registered hall calls. do not operate hall lanterns when stopping at a floor.

1.16 Elevator Performance

- .1 Provide smooth acceleration and deceleration of car without perceptible steps so as not to cause operator discomfort.
-

1.17 Schedule and Cost Breakdown

- .1 Within three (3) weeks after award of the contract submit, to the Departmental Representative for approval, a bar chart schedule indicating anticipated progress stages.
 - .2 Include in this schedule, the following information:
 - .1 Submission of shop drawings after award of contract
 - .2 Submission of TSSA Design Submission Application
 - .3 Material delivery lead time after shop drawing approval
 - .4 Complete removal of the existing elevator
 - .5 Hoisting of new equipment to machine room
 - .6 Installation of new machine room equipment
 - .7 Installation of hoist and governor ropes
 - .8 Set-up elevator to run on temporary inspection
 - .9 Installation of new hoistway entrances
 - .10 Travelling cable and hoistway wiring
 - .11 Installation of new hoistway door equipment
 - .12 Installation of car top wiring and levelling devices
 - .13 Installation of new car enclosure
 - .14 Installation and wiring of car station and hall fixtures
 - .15 Installation of new pit equipment
 - .16 Final adjusting time
 - .17 TSSA Inspection
 - .18 Departmental Representative Acceptance Inspection
 - .19 Correction of deficiencies
 - .20 Installation of machine guarding
 - .21 Total removal and installation time
 - .3 During the course of the construction phase submit Monthly ongoing work and material delivery schedule report. Indicate the percentage of work completed for labour and material.
 - .4 Submit a cost breakdown indicating the percentage or dollars value of the costs for the items listed below as a minimum.
 - .1 Engineering and TSSA submittals - maximum 5%
 - .2 Building related work
 - .3 Removal of the existing elevator
 - .4 Total installation labour
 - .5 Installation of new entrances
 - .6 Machine, controller and drive
 - .7 Hoistway door equipment and wiring
 - .8 Fixtures
 - .9 Car cab sling and enclosure
 - .10 Adjusting and TSSA inspections
 - .11 Operation and Maintenance Manuals
 - .12 Correction of deficiencies
-

Schedule and Cost Breakdown - cont'd

- .5 Provide one week's notice prior to the completion of the elevator and the date anticipated for the inspection.
- .6 Review and update the work schedule as the completion of the work progresses and notify the Departmental Representative in case of modification.
- .7 If the work falls behind the schedule, take action as necessary to meet the schedule, including, but not limited to, extra personnel and overtime work, at no additional cost to the Departmental Representative.
- .8 Pay costs associated with this action unless the delay is caused by strikes, acts of government, riot, civil commotion, war, malicious mischief, act of God or any causes beyond the control of the contractor.

1.18 Samples

- .1 Submit, in duplicate, 76mm X 127mm samples for each following component for review by the Departmental Representative.
 - .1 Hall operating fixtures.
 - .2 Car operating fixtures and hall position indicators.
- .2 Contractor is not to order any material or start any manufacturing until all drawings and or samples are approved by the Departmental Representative.

1.19 Shop Drawings

- .1 Submit shop drawings as required by Section 01 00 01.
 - .2 Indicate on shop drawings the following information:
 - .1 A layout of the elevator equipment located in the machine room including all new equipment complete with dimensions and weight.
 - .2 Characteristics of the equipment located in the machine room including KVA rating of transformer and heat dissipation of equipment.
 - .3 Complete car cab details showing materials, weight and finishes.
 - .4 Fixture details showing materials and finish. Hoistway doors and tracks.
 - .5 New hoistway entrance assemblies
 - .3 Provide shop drawings of all elevator machine room guarding components.
 - .4 Include machine guarding on the TSSA design submission as part of the modernization scope of work.
 - .5 Contractor is not to order any material or start any manufacturing until all drawings and or samples are approved by the Departmental Representative.
-

1.20 Record Drawings

- .1 Provide record drawings as required.
- .2 In addition, provide schematic wiring diagrams, including all changes made in final work, covering electrical and solid state equipment as supplied and installed, with a list of symbols corresponding to identification or markings on both machine room and hoistway apparatus.
- .3 Provide an electronic copy of final "as built" wiring diagrams.

1.21 Operation and Maintenance Manuals

- .1 Provide all information necessary for the safe and efficient maintenance of the equipment and incorporate into the maintenance manuals.
- .2 The maintenance data must include the following information:
 - .1 Description of system's method of lubrication, operation and control including, motor control system, door operation, signals, fire-fighter's service, and special or non-standard features provided.
 - .2 As built schematic wiring diagrams covering electrical equipment as supplied and installed, including changes made in final work, with a list of symbols corresponding to identification or markings on both machine room and hoistway apparatus.
 - .3 Copies of Technical Standards and Safety Authority Design Submission and Final Inspection Report, Re-inspection reports, and a copy of the Warranty letter.
 - .4 Copies of the Electrical Safety Authority Inspections.
 - .5 Parts catalogue giving complete list of repair and replacement parts with cuts and identifying numbers.
- .3 Any special tools, hand held devices, computers etc. required for the operation, testing, adjusting or setting parameters for the controller or car door operator must be left on-site in the machine room and will become the property of the Owner for future servicing and maintenance. All special tools are considered part of the elevator package.
- .4 Maintenance control plan (MCP) as per CAD Part 3.1 - Clause 8.6.1.1.1

1.22 Maintenance Service

- .1 At the completion of the construction project, provide long term maintenance as specified in the attached maintenance specifications.
-

1.23 Power Supply

- .1 The existing 575 volt power supply will be retained.
- .2 Design all equipment to suit the existing supply. Power supply may fluctuate $\pm 10\%$.
- .3 The Elevator Contractor shall be responsible for providing a true earth ground, shielding, or bonding as required to suit the new elevator equipment. The true earth ground wire is to be the same size as the feeder wires.
- .4 Any modifications carried out to the existing electrical system in the elevator machine room relating to elevator work shall be carried out by a licensed electrician and be inspected by the Electrical Safety Authority at the completion of the work. A copy of the inspection permit and report must be provided to the Departmental Representative.

1.24 Markings

- .1 No trade marks shall appear on any piece of equipment visible to the general public.

1.25 Overtime Work Included

- .1 All work related to the complete removal of the existing elevator, installation, adjusting and testing of the new elevator must be carried out between the hours of 5:00 PM and 6:00 AM Monday to Friday. A start time of 8:00 AM is acceptable for any weekend work required.
- .2 Obtain from the Departmental Representative, a "Hot Work Permit" where any cutting, welding, grinding, or any work that emits sparks or flames. Do not proceed with this type of work until the Hot Work Permit has been issued.

1.26 Use of Elevators For Persons with Physical Disabilities

- .1 Comply with the requirements of Appendix E of the CSA-B44 Safety Code For Elevators and all other governing codes and regulations.
 - .2 Provide raised character and braille floor designations on both jambs of the entrance frames at all floors. Provide a raised star to the left of the floor designation symbol on both jams at the main entry level. All characters to be 50mm high.
-

1.27 Occupied Premises and Barricades

- .1 Take into consideration the fact that this is an occupied building and must continue to function during the course of the modernization with a minimum of disruption.
- .2 The Contractor's employees shall be appropriately attired in Company Uniforms, be courteous to the occupants and abide by the same building rules and regulations required of the occupants.
- .3 All work must be performed in a manner that ensures the safety of the occupant and the user of the operating elevators. Should it be necessary to perform work where such safety cannot be ensured, it shall also be performed at a time acceptable to the Departmental Representative and during hours other than normal building business hours at no additional cost to the Departmental Representative.
- .4 All hoarding shall be removed at the end of the installation.
- .5 Provide barricades as required to protect the Public from hazardous conditions. Obtain Departmental Representative's approval for the appearance of all barricades erected.

1.28 Technical Seminar

- .1 Upon completion of the work, arrange with the Departmental Representative to provide a seminar in French and English for the Owner's staff.
 - .2 The seminar shall include a complete review of all documentation, operation of equipment, and demonstration of special features. Allow a minimum of four (4) hours for the seminar.
 - .3 Provide Departmental Representative, with a laminated copy of the detailed procedures for resetting the Firefighters' Operation from the main and duplicate switches.
-

PART 2 - PRODUCTS

2.1 Components

- .1 Use major elevator components from standard product line of one manufacturer unless otherwise approved by Departmental Representative. Major components includes; elevator machine, motor, controller, hoistway door and control equipment.
- .2 All materials and equipment shall be new. Furnish samples as directed by the Departmental Representative.

2.2 Wiring, Conduit and Fittings

- .1 Provide all new insulated wiring. Provide new wiring from the disconnect switch to the elevator controller.
 - .2 Provide insulated wiring having a flame retarding and moisture resisting outer cover. Run the wires in metal duct.
 - .3 Provide and connect all hoistway wiring, traveling cables, car wiring, etc., and all remote alarm indicators or other similar items, from the device to terminal blocks mounted on the controller.
 - .4 Provide a separate junction box, mounted on the side of the controller in the machine room, with terminals for the connection of "non elevator" devices, such as telephones, card reader interface and connect from the elevator controller to this junction box, as required.
 - .5 Provide ten percent (10%) additional minimum spare wires.
 - .6 Check all wires, including spares, for continuity and grounds, and mark each wire by a number and each group as to destination.
 - .7 Mark all connections on intermediate terminal blocks with corresponding numbers.
 - .8 Where provided ensure all flexible conduit is aluminum type.
 - .9 Mark all individual wires by numbered adhesive waterproof markers.
 - .10 Identify wires of multi-wire cables by colour code.
 - .11 Label all terminal and junction boxes as to their function with permanently attached waterproof labels.
 - .12 Label group of wires and multi-wire cables and mark all terminals with waterproof markers.
 - .13 Provide stranded field wire with no splices.
-

Wiring, Conduit and Fittings - cont'd

- .14 Attach to each controller a legible list, neat and waterproof, showing wiring runs, colour codes, and numerical codes.
- .15 Provide a supplementary, shielded cable running from machine room to the elevator, containing a sufficient number of shielded wires for eventual connection of security video camera.
- .16 Do not use armoured flexible metal conduit as grounding conductor. Provide a separate ground wire in all flexible metal conduit where grounding is required.
- .17 Limit the use of flexible conduit on the car top to items that require movement or periodic adjustment. Excessive use of flexible conduit will be rejected.
- .18 Provide a separate identified green ground wire to all switches and components connected by flexible conduit, such as, but not limited to, hoistway door locks, car gate switch, hall and car push buttons and limit switches.
- .19 All flexible conduit that rests on the car top must be installed in a uni-strut which is at least the same height as the conduit.
- .20 All grounding or bonding conductors shall have a continuous outer finish that is green or green with one or more yellow stripes.
- .21 The conductors from the controller to the hoistway door locks shall meet the requirements of Rule 2-126 and Clause 38-011 of the Canadian and Ontario Electrical Safety Codes. The wiring must be rated for 200 centigrade and be of the SF type or equivalent.

2.3 Travelling Cables

- .1 Provide new flexible travelling cable designed specifically for elevator use.
 - .2 Terminate cables on terminal blocks having identifying numbers to facilitate replacement and service.
 - .3 Provide travelling cable with flame retarding and moisture resisting outer covers.
 - .4 Suitably suspend the travelling cables to relieve strain in the individual conductors, using a steel supporting strand with appropriate supports if the suspended weight exceeds 34 kg.
 - .5 Provide ten percent (10%) additional minimum spare wires in each travelling cable.
 - .6 Provide in the travelling cables, at least five (5) pairs, shielded wires for audio, video or other electronic equipment.
-

2.4 Sound Isolation

- .1 Provide sound isolation with resilient pads to effectively isolate the machine from the machine beams or flooring.
- .2 Prevent lateral displacement of machine.

2.5 Lubrication

- .1 Include means of lubricating bearings, requiring periodic lubrication.
- .2 When used, provide all grease fittings to fit same gun.
- .3 Provide visible and easily accessible lubrication points.

2.6 Roller Guides

- .1 Provide new spring loaded type car and counterweight roller guides. Rollers shall be minimum 150 mm for the car and 75mm for the counterweight respectively.
- .2 Provide each guide with durable, oil resistant and resilient rubber tired ball bearing rollers to run on three finished rail surfaces.
- .3 Maintain each roller on its respective guide in uniform contact with rail surface at all time by means of substantial springs or by flexible mounting.
- .4 Provide guide operation, which is inaudible to passengers in the car or outside of the hoistway with the car operating at rated speed and car fan turned off.
- .5 Use roller tire material which will not develop flat spots after standing idle for 24 hours under average environmental conditions.

2.7 Suspension Ropes and Fastenings

- .1 Provide new steel wire rope constructed for elevator service, for the suspension of the elevator car and counterweight.
 - .2 Provide as a minimum, individual compression springs on counterweight dead end to equalize tension in ropes.
 - .3 Ropes installed on the elevator, shall be from the same factory production run.
 - .4 Provide minimum 9mm diameter metal anti-rotation devices to secure all terminations after installation to prevent rotation of fastenings in hitch plates.
 - .5 Provide approved type wedge socket wire rope fastenings.
 - .6 The returned end of the wire ropes on wedge clamp fastenings are to be secured with two (2) retaining clips. The first clip is to be set approximately 50 mm above the top of the wedge clamp, the second clip at 100 mm above the first clip. The end of the wire rope is to be bound and tied or taped to prevent injury.
-

2.8 Guide Rails and Fastenings

- .1 Provide new standard "T" section guide rails for the car. Rail extremities shall be machined with tongue and grooved joints and substantial machined plates shall be used to form the joint between two (2) consecutive elements.
- .2 Guide rails shall be erected perpendicularly parallel and plumb within maximum deviation of 3 mm on the total length of the rise. They shall be supported and placed so as not to become distorted by eccentric loading.
- .3 Guide rails shall be securely attached to every floor by support brackets from the bottom of the pit to the under side of the overhead slab. Provide adjustable brackets in the pit.
- .4 Wall anchorage for guide rails support shall be provided by the elevator contractor.
- .5 Provide car rails and brackets to suit Class C3 Loading.
- .6 Use metal shims only and provide lock-washers under nuts and tapped bolts.
- .7 Compensate for expansion and contraction of guide rails.
- .8 Use fish plates and guide rails with contact surfaces accurately machined to form smooth joints.
- .9 Include steel reinforcement rail backing.
- .10 Anchor guide rails in pit so as not to reduce the effectiveness of the waterproofing.
- .11 After final guide rail alignment, dowel or permanently weld rail brackets.
- .12 The existing counterweight rails may be retained if compatible and are in the right location for the new machine and car enclosure
- .13 Remove and clean all protective coatings and rust from the guide rails and the machined surfaces to ensure smooth operation.

2.9 Spring Buffers

- .1 Provide new spring buffers.
- .2 Do not compress buffers when car is level with bottom landing.

2.10 Buffer Extension and Supports

- .1 Provide where necessary all extension, reinforcement, support brackets, working platform and ladders to suit pit depth according to Code Requirement.
-

2.11 Counterweight

- .1 Provide a counterweight of structural or formed metal frame type with metal filler weights. Provide rods through weights and frame. The existing counterweight frame and bricks may be retained if compatible with new elevator equipment.
- .2 Balance counterweight to equal the weight of the complete elevator car cab, frame and platform plus 40 to 42.5% of the contract load.
- .3 Check runby and post sign in the vicinity of the counterweight buffer indicating the maximum designed runby for this installation.
- .4 Statically balance the counterweight so that when the counterweight is at the centre of the hoistway it will hang in the centre of the rails with the top guides removed.
- .5 Provide blocking under counterweight, where required.

2.12 Car Safety

- .1 Provide new under car safety in accordance with clause 2.7.1 of the B44 Safety Code For Elevators
- .2 Perform full load overspeed test in the presence of the Departmental Representative.

2.13 Top of Car Inspection Operation

- .1 Provide new Top-Of-Car Inspection operation with open door circuits in accordance with clause 2.26.1.4.2 of the CSA-B44 Safety Code For Elevators.

2.14 Car Overspeed Protection

- .1 Provide means to prevent a car from Overspeeding in the ascending direction of travel in accordance with clause 2.19.1 of the CSA-B44 Safety Code For Elevators. Include all materials and labour required, either for or as a result of the mounting and installation of the device.
 - .2 Detect any uncontrolled movement of the car prior to or, at a minimum, at the time when the car reaches a predetermined overspeed, and cause the car to stop prior to the time when the counterweight strikes its buffers, or at least reduce the car speed to the speed for which the buffer is designed.
 - .3 Device to be capable of performing as required without assistance from any elevator component that solely, without built-on redundancy, controls the speed, or deceleration, or stops the car during normal operation.
 - .4 Device required to perform this function must apply pressure to the hoisting ropes not the drive sheave.
-

2.15 Car Uncontrolled Low Speed Protection

- .1 Provide means to prevent any uncontrolled movement of the car in accordance with clause 2.19.2 of the CSA-B44 Safety Code For Elevators
- .2 Detect any uncontrolled movement of the car before the car travels away from the landing by more than 500mm and bring the car to a full stop before it travels an additional 750mm.
- .3 Device to be capable of performing as required without assistance from any elevator component that solely, without built-on redundancy, controls the speed, or deceleration, or stops the car during normal operation within the levelling zone
- .4 Device required to perform this function must apply pressure to the hoisting ropes not the drive sheave.

2.16 Car Overspeed Governor

- .1 Provide new overspeed governor and wire rope designed to suit speed and capacity of the elevator.
- .2 Provide new governor tension sheave in pit.
- .3 Calibration of the new governor shall be checked in the presence of the Departmental Representative.

2.17 Geared Traction Machine

- .1 Remove existing machine and install new machine.
 - .2 Provide traction type single wrap geared machine with 2:1 roping arrangement.
 - .3 Geared machine to consist of an AC motor, electromechanical brake, steel worm, bronze gear, steel sheave shaft and traction sheave mounted in proper alignment on a suitable bed-plate.
 - .4 Provide reversible AC motor with high starting torque and moderate starting current, specifically designed to meet the severe loads encountered in elevator service. Provide motor with a slip specification of 5% or less, or a NEMA rating of "A" or "B".
 - .5 Provide not less than one (1) megohm insulation resistance between motor windings and motor frame.
 - .6 Worm to be manufactured from annealed or stress relieved steel, accurately machined, ground and provided with a single end, double race and ball bearing thrust. Gear to be manufactured from a phosphor bronze rim, accurately cut, fitted and bolted to a cast iron spider.
-

Geared Traction Machine - cont'd

- .7 Design to permit removal of thrust unit without dismantling machine.
- .8 Include means for lubrication and provide oil tight inspection ports for worm gear face, gear contact and gear mounting bolts.
- .9 Fabricate traction sheave from mehanite cast iron properly grooved for the cables and demountable from the gear sheave spider.
- .10 Design brake to be spring applied, electromagnetically released and quietly operated by direct current. Design and adjust for holding the car cab with 125% of the rated load. Impregnate winding with insulation and bake to prevent absorption of moisture and oil.
- .11 Design and adjust the machine so that when running at contract speed, vibrations shall not exceed a reading in excess of 0.3 mm taken at the end of the drive motor. The total back lash of the gear and the end play of the worm shall not exceed 0.178 mm as measured with balanced load plus 90 kg and balanced load minus 90 kg.
- .12 Provide hoist cable oilers.

2.18 Sheaves and Supporting Beams

- .1 Provide new deflector sheaves and any beams necessary to obtain the proper lead of the ropes to car and counterweight.
- .2 Provide sheaves of cast iron, accurately machined and grooved for the diameter of ropes used and supported by steel beams or channels furnished in place by Elevator Contractor.
- .3 Provide all sheaves sufficiently larger than that required by Code, in pitch diameter and thickness, to permit at least one regrooving of sheave.
- .4 Provide metal guards for two to one sheaves on car and counterweight. Paint guards yellow as per Section 09 91 23.01

2.19 Limit Switches

- .1 Replace all slowdown and final limit switches with new switches.
- .2 Dowel final limits to brackets after final adjustment.

2.20 Direct Current Supply

- .1 Provide rectifiers to supply direct current for elevator machine brake, control and operating equipment.
-

2.21 Variable Voltage Variable Frequency Control

- .1 Provide a variable voltage variable frequency, flux vector control system designed for a three phase AC induction motor. System to be capable of producing full torque at zero speed and shall utilize a shaft mounted position transducer to accurately measure the rotating frequency.
 - .2 Provide closed loop tachometer feedback control. Continuously monitor the elevator speed signal from the 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.
 - .3 Provide stepless acceleration and deceleration and smooth operation at all speeds.
 - .4 Use a three-phase, full wave bridge rectifier and capacitor bank to provide a DC voltage bus for the solid-state inverter.
 - .5 Use power semiconductor devices and pulse width modulation, with a carrier frequency of not less than 10 kHz, to synthesize the three-phase, variable voltage variable frequency output to operate the hoist motor in an essentially synchronous mode.
 - .6 The drive shall not create excessive audible noise in the elevator motor.
 - .7 Provide 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 hoist motor. A.C. motor to have a slip specification of 5% or less, or a NEMA rating of "A" or "B".
 - .8 Provide a heavy duty type drive, capable of delivering sufficient current required to accelerate the elevator to contract speed with rated load and be able to maintain a 180% to 200% current overload for 3 seconds and a 150% current overload for 60 seconds. Equip drive with an electronic automatic stall prevention and voltage boost to prevent nuisance tripping during load or line transient conditions.
 - .9 Provide means for removing regenerated power from the drive's DC power supply during dynamic braking. This power shall be dissipated in a resistor bank, which shall be 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.
 - .10 Provide a contactor to disconnect the hoist motor from the output of the drive unit each time the elevator stops. Monitor contactor to ensure that the elevator will not restart if the contactor has not returned to the de-energized position when the elevator stopped.
 - .11 Open all power feed lines to the brake by an electro-mechanical switch. A single ground, short circuit or solid-state control failure shall not prevent the application of the brake.
 - .12 Arrange to continuously monitor the performance of the elevator in such a way that if the car speed exceeds 0.75 m/s during inspection operation or levelling, the car shall shut down immediately. Provide manual resetting.
-

Variable Voltage Variable Frequency Control - cont'd

- .13 The system shall not require DC injection braking to control the stopping of the elevator.
- .14 Provide encoder feedback to regulate hoist motor speed. Mount encoder on the motor shaft.
- .15 Provide a multi-functional diagnostic display in each drive. Display the following as a minimum:
 - .1 Line power loss.
 - .2 Instantaneous over current.
 - .3 Ground fault.
 - .4 Over voltage.
 - .5 Under voltage.
 - .6 Regeneration overload.
 - .7 High temperature, both motor and control.
 - .8 Circuit defect in drive unit.
 - .9 Loss of motor field.
 - .10 Soft start fault.
 - .11 Torque proving fault.
 - .12 Over speed.
 - .13 Faulty phase.
 - .14 Open brake resistance.
 - .15 Amperage

2.22 Automatic Self-Levelling Feature

- .1 Provide self-levelling device which will automatically bring car to within 6.35mm or better, above or below the landing sill.
- .2 Compensate for overtravel or undertravel and bring car level to landing sill.

2.23 Controller and Cabinet

- .1 Enclose controller in enameled ventilated sheet cabinet. Provide hinged doors for easy access.
 - .2 Provide contacts to insure maximum conductivity with a wiping action to prevent sticking and fusion.
 - .3 Provide electronic time delay devices which employ stable capacitors or crystals as time base.
 - .4 Wiring on the controller, whether control or field wiring, must be done in neat, workman like order and all connections made to studs and terminals by means of wire lugs or similar connections.
 - .5 All relays, contactors, fuses and printed circuit board components, etc., shall be clearly marked by means of tags not easily removable.
-

2.24 Computing Devices

- .1 Isolate the inputs to micro-processors from external devices (such as push-buttons) and isolate the outputs to external devices (such as indicators) by means of relays or optical devices.
- .2 Provide the control program on read-only-memory with a minimum of 40% spare capacity, to allow for future programming modifications and extension.
- .3 Provide for separate regulated power supplies to serve each micro-processor system.

2.25 Selector

- .1 Provide a hoistway car position system, electrically coupled to the controller.
- .2 Design system to provide the controller with precise information as to the absolute position of the elevator within the hoistway.
- .3 Provide solid state devices, pulse generators, or magnetic switches, in combination with a fixed steel tape, for position and direction indication, speed reduction, levelling, door zone and related signals.
- .4 Do not use electro-mechanical stepper switches.
- .5 Design the unit so that the parts are readily accessible for replacement and adjustment.

2.26 Hoistway Switches

- .1 Hoistway switches shall be silent in their operation and inaudible to passengers in the car.

2.27 Solid-State Hardware

- .1 Mount solid-state devices, except for high power silicon controlled rectifiers, on removable printed circuit boards.
 - .2 Gold plate the contact points of edge connectors.
 - .3 Provide plated through holes for double sided boards.
 - .4 Make all connections to the printed circuits on the printed circuit boards by means of properly dimensioned pads.
 - .5 "Patched" connections will not be accepted.
 - .6 Design solid-state devices for a high level of noise immunity.
 - .7 Incorporate electrical noise suppression devices in the power supplies and the inputs and outputs associated with the solid-state circuits.
-

2.28 Control Circuit Grounding

- .1 Arrange the control circuits so that one side of the control power supply for external circuits is grounded to facilitate testing and trouble shooting.

2.29 Hoistway Door Frames and Sills

- .1 Hoistway doors shall have at every landing a clear opening of 1066mm in width and 2130mm in height and be of the centre opening type.
- .2 Limit override opening and closing by cushioning through rubber bumpers and/or astragal.
- .3 Door frames at all floors shall be finished in Stainless Steel #4 satin finish.
- .4 Door frames at all floors shall be of a standard model; either full and/or mini three piece frame adapted to the thickness of walls as indicated on the drawing.
- .5 Provide any additional sill supports as required for Class C3 Loading.

2.30 Hoistway Doors

- .1 Construct centre opening doors of flush type steel sheets. Doors at all floors shall be finished in Stainless Steel #4 satin finish.
- .2 Hang doors with the closing mechanism released, to close regardless of their position on the track, when a 2.7 kg horizontal force is applied at mid height on the door in the horizontal motion.
- .3 Reinforce doors to receive attachments and to withstand strains due to power operation.
- .4 Paint 100mm numerals on hoistway side of hoistway doors to identify floor level.

2.31 Hoistway Door Fire Rating

- .1 Doors shall be 1.5 hr. fire rated in conformity with NBC, produced under label service program of ULC or other agency acceptable to authorities having jurisdiction.
- .2 Affix ULC or other acceptable agency label on doors and accessories.

2.32 Hoistway Access Device

- .1 Provide at top and bottom landings keyed hoistway access switches.
 - .2 Locate switch in the hall button fixture or sight guard and engrave "Hoistway Access" with direction arrows on face plate.
 - .3 Provide hoistway -door unlocking devices at every landing . Provide Stainless Steel collars for all lunar key holes. Securely maintain collars in place.
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2.33 Fascias

- .1 Provide fascias of minimum 1.9mm sheet steel, rigidly fastened from the header of one entrance to the sill of the entrance above, for all served floors.
- .2 Provide fascias extending below the sill of the lowest landing.

2.34 Hoistway Door Hangers, Tracks, Locks and Closers

- .1 Provide door hangers, tracks, and closers.
- .2 Provide a single hoistway door lock to lock each door panel, include ground wire back to controller.
- .3 Provide sill mounted spring type closers. One closer per door panel.
- .4 Provide two (2) suspension hangers for each door panel rolling on appropriate tracks using rollers of not less than 82mm diameter, coat grooves with resilient flexible material.
- .5 Provide rollers with ball or roller sealed bearings designed to retain lubricant, equipped with cleaning and lubricating wiper to maintain rollers and track in clean condition. Provide two (2) door gibs.
- .6 Absorb upthrust with heavy duty type adjustable eccentric rollers equipped with ball or roller bearings.
- .7 Hoistway doors to be hung with the closing mechanism released, and shall start to close regardless of their position on the track, when a 2.7 kg horizontal force is applied at mid height on the door in a horizontal motion.

2.35 Car Doors

- .1 Provide car doors of the centre opening type.
 - .2 Manufacture doors from steel sheet, smooth finish, of not less than 1.9 mm. Construct the door to withstand the strains imposed by the door operating equipment.
 - .3 Finish car side of doors in Stainless Steel #4 finish.
 - .4 Hang with the operating mechanism released, to close regardless of their position on the track, when a 2.7 kg horizontal force is applied at mid height on the door in the horizontal motion.
-

2.36 Car Door Hangers and Tracks

- .1 Provide two (2) suspension hangers for each door panel rolling on appropriate tracks using rollers of not less than 82 mm diameter, coat grooves with resilient flexible material.
- .2 Provide rollers with ball or roller sealed bearings designed to retain lubricant, equipped with cleaning and lubricating wiper to maintain rollers and track in clean condition.
- .3 Absorb upthrust with heavy duty type adjustable eccentric rollers equipped with ball or roller bearings.

2.37 Car Door Operator

- .1 Provide a heavy duty high speed closed loop motor feedback door operator designed to open and close the car and hoistway doors simultaneously, quickly and smoothly .
- .2 Open doors to 62 mm from full opening in not more than 2.0 seconds and close in not less than 2.8 seconds.
- .3 Operate doors positively, reliably and consistently under air pressure differentials.
- .4 Open and close door operation to be electrically cushioned at final limits of door travel.
- .5 Provide door operator capable of moving the doors from the closed position to within 62 mm of full open position at an average speed of not less than 0.9 m/sec.
- .6 Provide a gate switch for each door panel operated by a roller attached to the door panel.
- .7 The flexible conduit from the car door operator motor to the control box must be installed in a metal uni-strut to protect against obstructions on the car top. Uni-strut must be higher than the flex.

2.38 Infrared Proximity Detector

- .1 Provide a 3D Panachrome infrared proximity detector of minimum 24 infrared beams equally spaced.
 - .2 Detector to protect the full door opening, such that a person or object passing through the car entrance causes the doors to re-open.
 - .3 The zone of protection shall extend from 12.7 mm above the sill to a minimum height of 1500 mm, on each car door panel.
 - .4 Device to be reliable and consistent in operation, not affected by humidity or temperature changes and have inherent long term reliability with minimum maintenance.
-

2.39 Reduce Speed Door Closing

- .1 Should the doors be held open by the "proximity detector" for more than 20.0 seconds, sound a buzzer and reduce the door closing kinetic energy to 3.5 j. Time delay to be adjustable.

2.40 Car Platform and Sill

- .1 The car platform shall consist of a structural steel frame filled with 12mm plywood sub-flooring. Sill to be set to suit 6mm aluminum checker plate flooring.
- .2 Mount car platform on rubber pads supported on auxiliary sub-frame fastened to car frame to form isolating cushion between car and steel car frame.
- .3 Car platform to be designed to suit C3 Loading Requirements.
- .4 Provide a nickel silver car sill.

2.41 Car Frame and Sling

- .1 Provide a car sling designed for C3 Loading requirements.
- .2 The car frame shall consist of steel "U" channels and angles securely welded, bolted or rivetted and substantially reinforced and braced so as to relieve the car enclosure of all strains.
- .3 Car frame to be designed to suit C3 Loading Requirements.

2.42 Top of Car Operating Device

- .1 Provide top of car operating device, with an alarm bell designed to operate on normal and emergency power, duplex receptacle, and work light. Provide two (2) permanent guarded lights on car top. Provide lights on a raised support to provide adequate lighting at the rear of the car top.
- .2 Provide an **additional** portable hand held operating fixture. Provide a sufficient length of cord to ensure safe operation from all areas of the car top. Provide means to securely store the fixture on the car top when the unit is not in use. Paint the storage unit yellow in colour.

2.43 Top of Car Railing

- .1 Provide a standard railing around the back and sides of the car top. Construct rail of steel tubing securely fastened to the perimeter of the cab and braced. Extend the railing from the crosshead towards the front of the hoistway on both sides. Do not interfere with running or overhead clearances. Paint railing yellow in colour.
 - .2 Railing to comply with clause 2.10.2 of B44 Code and TSSA Director's Ruling 245/10.
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2.44 Car Enclosure

- .1 General : Comply with clause 2.14.1 of B44 Code.
 - .1 Fabricate complete car enclosure of minimum 1.9 mm sheet steel. Enclosure walls to be solid to permit removal of raised panels without revealing any wall openings. Comply with ULC Standard, CAN/ULC- S102, Flame spread rating for cab walls and ceilings and ULC Standard, CAN4- S102.2, Flame spread rating for cab floors
 - .2 Provide minimum clear cab height of 2438mm to underside of ceiling if existing overhead clearances permit.
 - .3 All panels to be of the hang-on type designed for removal from inside the car cab. All fastenings to be concealed. Where screws must be used they shall be of the vandal resistant type.
 - .4 Submit detailed shop drawings of cab details for review by the Departmental Representative.
 - .2 Ceiling
 - .1 Manufacture the ceiling using sheet steel smooth finish and free from defects and of a thickness not less than 12 gauge. The ceiling panel to be in one piece, white colour baked enamel finish, with final coat brought to semi-gloss. The emergency exit in the ceiling to be of the same material and finish.
 - .2 Provide metal egg-crate dropped ceiling 12mm x 12mm x 19mm thick, supported on hung type ceiling frame finished in Stainless Steel. Provide minimum two fluorescent ceiling light fixtures using rapid start, high power factor ballasts, sound rated "A". Design for illumination of 315 lx maximum measured 0.75 m above floor and 200 lx minimum at car sill with doors open or closed. Conceal all wiring and ballasts.
 - .3 Front Return Panel and Car Door
 - .1 Clad front return panel, above transom, and car door with Stainless Steel #4 satin finish.
 - .4 Side and Rear Walls
 - .1 Provide on both side walls from the kick plate to within 50 mm of the underside of the ceiling three (3) raised panels, constructed of 12.5 mm High Density Fire Rated Board, clad in Avesta Stainless Steel Deco 1 pattern
 - .2 On the rear wall above the handrail, provide three (3) laminated glass grey smoked mirrors extending from the handrail to the ceiling and the full width of the car cab. Contain mirrors in rigid Stainless Steel frame. Fasten mirror to wall with silicone. Under handrail, provide 3 raised wall panels similar to side walls.
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Car Enclosure - cont'd

- .3 Balance boards to ensure against warping.
- .4 Provide reveals of approximately 50mm, above and between each panel and from each corner. Reveal strips to be Stainless Steel #4 satin finish.
- .5 Handrails
 - .1 Provide handrails at 900mm above floor on three sides of car with ends returned close to panels. Design to be removable from inside the car fastened with set screws. Space handrails 35 to 45mm from wall.
 - .2 Handrails to be constructed of 100mm by 6mm flat Stainless Steel plates, and returned to walls at each end.
- .6 Truck Rails
 - .1 Provide truck rails at 300mm to top above floor on three sides of car with ends returned close to panels. Design to be removable from inside the car fastened with set screws. Space truck rails 35 to 45mm from wall.
 - .2 Truck Rails to be constructed of 100mm by 6mm flat Stainless Steel plates, and returned to walls at each end.
- .7 Kick Plates
 - .1 Provide kick plates constructed of 12.5 mm High Density Fire Rated Board clad in Stainless Steel #4 satin finish
 - .2 Design kick plates so that the face of the kick plate and the face of the raised panels are flush.
- .8 Entrance Columns
 - .1 Clad entrance columns with Stainless Steel #4 satin finish.
- .9 Flooring
 - .1 Finished flooring to be 6mm Aluminum checker plate polished to a dull finish.

2.45 Car Protective Pads

- .1 Provide Stainless Steel hooks in the car cab. Space hooks minimum 250mm apart.
 - .2 Provide one complete set of protective pads. Cover all exposed wall surfaces and the front return panel (except the car station) and covering from 100mm to approximately 2600mm above the car floor.
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2.46 Car Top Light

- .1 Provide two (2) permanently connected and guarded lights on the car top.
- .2 Provide a minimum of 300 Lx lighting level at any location on the car top.
- .3 Provide a GFI duplex receptacle on car top.

2.47 Car Operating Panel

- .1 Provide in the car cab, one (1) car operating panel, with hinged Stainless Steel faceplate. Provide a service cabinet in this panel.
 - .2 Locate all buttons in accordance with Appendix E, of the B44 Safety Code For Elevators.
 - .3 Buttons to be of stainless steel, vandal resistant design. Provide tactile plates permanently attached by means of rivets or other approved fastenings to the left of each button; use international symbol for "Street Exit" level. All other markings to be engraved on the faceplate. Attached plates will not be accepted.
 - .4 Beside each car call button, provide a high security Medeco key switch to provide restricted access to the call button. Provide a **separate** key switch for each call button. Key switches to be overridden when on Phase II Firefighter's Operation.
 - .5 Common devices to be included in the car station are as follows:
 - .1 Floor push buttons with integral illumination using blue LED type lights with a minimum 100,000 hour rating. Illuminate button and provide momentary audible signal when call is registered and extinguish the call when the car stops at the selected floor.
 - .2 Alarm, door open, and door close buttons. Door open button to be located at the side of the panel closest to the entrance frame.
 - .3 Lens for Emergency Lighting System as specified elsewhere in these specifications.
 - .4 Perforation holes for a hands-free communication system, as specified elsewhere in these specifications. Provide a yellow International Telephone Symbol and engraved wording "PHONE". Provide an LED visual indicator and engraving, to indicate to persons with hearing disabilities that their call for assistance has been acknowledged.
 - .5 "PHONE" button to be installed at 1220mm above the floor. Provide a raised 6mm high stainless collar around the "PHONE" button to prevent accidental activation. Spot weld collar to car operating panel.
 - .6 Visual and audible signal for Special Emergency Operation.
-

Car Operating Panel - cont'd

- .7 Audible signal to sound when the car stops at or passes a floor. Signal volume to be adjustable between 50 and 70 dBA.
- .6 Provide in the service panel, key switches, appropriately marked by wording or symbols, to control the following:
 - .1 Car Lights.
 - .2 Two-speed car ventilating fan.
 - .3 Test button for emergency lighting
 - .4 Independent service switch.
 - .5 Emergency stop switch.
 - .6 A GFI duplex receptacle.
- .7 Engrave the following on the operating panel.
 - .1 Elevator Number in minimum 50 mm numerals.
 - .2 Elevator Capacity in Kilograms and Number of Persons.
 - .3 TSSA Installation Number and Logo
 - .4 "Licence located in machine room" in letters 12mm in height. Engrave with black fill.
- .8 Provide at the top of the car operating panel, a digital car position indicator. Use Blue LED type, 100,000 hour rating, on a high resolution screen display. Ensure bright and even illumination.
 - .1 Display letters and numbers at least 50 mm high. Provide protector of tempered glass.
 - .2 Letters and numbers must indicate the position corresponding to the landing through which the car is passing or at which it is stopped.
- .9 Submit samples of buttons and layout drawing to Departmental Representative for approval.
- .10 Contractor is not to order any material or start any manufacturing until all drawings and or samples are approved by the Departmental Representative.

2.48 Hall Position Indicators

- .1 Provide above the entrance at the main floor a combination position indicator and directional lanterns.
 - .2 Display letters and numbers for the digital - dot matrix position indicator in segmented format at least 50 mm in height. Use Blue LED type, 100,000 hour rating, on a high resolution screen display. Arrange letters and numbers appearing on the indicator to illuminate in sequence and to transfer illumination instantaneously between floor levels.
 - .3 Provide Stainless Steel faceplates.
 - .4 Fasteners shall be concealed.
-

Hall Position Indicators - cont'd

- .5 Do not mount lantern equipment on the faceplate.
- .6 Submit layout drawing and sample of car and hall lanterns to Departmental Representative for review.
- .7 Contractor is not to order any material or start any manufacturing until all drawings and or samples are approved by the Departmental Representative.

2.49 In-Car Lanterns and Gongs

- .1 Provide in-car lanterns with electronic "Chime" type gongs. Locate lanterns in car door jamb post, with the centerline of the fixture 1830 mm above the floor.
- .2 The lantern indicator shall consist of an LED digital display in the shape of an arrow, mounted flush with the faceplate. Use LED type, 100,000 hour rating, on a high resolution screen display.
 - .1 Visual elements shall be a minimum of 60 mm in the smallest direction.
 - .2 The lens for the Up direction shall be green in colour, and the lens for the Down direction shall be red in colour.
- .3 Arrange lanterns so that when the car stops in response to either a car call or a hall call, the in-car lantern, corresponding to the direction of travel, illuminates and the gong operates as the doors are opening. Signal volume to be adjustable between 60 and 90 dBA. Lantern to remain illuminated until the car closes its doors.
- .4 In case of over travel arrange the in-car lantern to remain illuminated indicating original direction of travel.
- .5 Sound gong once for "UP" and twice for "DOWN" stops.
- .6 Lantern fixture plate shall be of Stainless Steel finish and brushed vertically.
- .7 Fasteners shall be of the vandal resistant type.

2.50 Hall Buttons

- .1 Provide one (1) riser of hall call buttons with integral illumination, incorporating Blue LED type lights with a minimum 100,000 hour rating, complete with boxes. Buttons to be of same design as car buttons complete with Stainless Steel faceplates.
 - .2 Locate buttons to conform with Appendix E of the B44 Safety Code For Elevators.
 - .3 Illuminate call button when call is registered. Extinguish illumination when call has been answered.
 - .4 Provide an out of service indicator light and engraving in each fixture. Include an out of service toggle switch at controller. Out of service indicator is to illuminate any time service is denied to the hall buttons.
-

2.51 Special Hall Station At Designated Floor

- .1 Provide at the designated level floor a flush mounted Stainless Steel fixture containing the Fire Recall key switch with appropriate indicator lights.
- .2 The key switch shall be a three (3) position RESET- OFF- ON for the Fire Recall service. Provide quality type key switches of the Group 3 classification.
- .3 Provide at the designated level near the elevator hoistway an identified metal box containing the emergency recall keys.

2.52 Signal Illumination

- .1 Illuminate all letters and all numbers with sufficient intensity to produce distinct and well defined indication under ambient lighting conditions.

2.53 Faceplate Fastenings

- .1 Fasten all signal fixture face plates securely with unexposed fasteners or with tamper-proof fasteners.

2.54 Car Ventilation

- .1 Provide ventilation by an exhaust air handling unit through the cab ceiling and through concealed perforation at cab base.
- .2 Limit total fan noise to 55 dBA as read from 0.9 m above floor with fan on high speed.
- .3 Mount air handling unit on top of car and effectively sound isolate system from car to prevent transmission of vibration to car structure.
- .4 Include two speed operation of ventilation system: approximately 330 dm³/sec on high speed and 165 dm³/sec on low speed.

2.55 Car Emergency Lighting

- .1 Provide battery operated emergency lighting equipment.
 - .2 Mount power pack on car top and light fixture in car station as specified elsewhere. Provide general illumination in the car with a minimum of 50 lx intensity 1200 mm above the car floor and 300 mm in front of the operating panels for at least a four (4) hour period.
 - .3 Include means for convenient manual operation and testing of the unit in the car station. Arrange test switch to turn off normal lighting when testing emergency lighting.
-

2.56 Emergency Communications System In the Car

- .1 Comply with clause 2.27.1.1.1 of the B44 Code.
 - .2 Provide a hands free, vandal resistant, emergency communications device containing an internal adjustable volume control speaker and microphone, to enable two-way voice communication between the car and a location in the building that is readily accessible to authorized and emergency personnel.
 - .3 The device shall be activated by pressing the PHONE button located in the car station and shall automatically ring a telephone number of the Departmental Representative's choice. Once activated in the elevator the line shall remain open until disconnected by the receiver.
 - .4 Provide an LED and engraving to visually indicate that the call has been answered. Provide beside the PHONE button, an International Telephone Symbol as per E-11.2 of the B44 Code and the operating instructions.
 - .5 The line dialler network shall operate on any central office line along with conventional phones and shall have an internal battery for memory back-up for a minimum of two years in the event that power fails or the dialler is removed from the telephone line.
 - .6 The device shall contain a ring sensor which shall allow the initiation of a call to the elevator. The number of rings shall be adjustable. The two-way communication shall not be transmitted to an automatic answering system.
 - .7 The two-way communications, once established, shall be disconnected only when authorized personnel outside the car terminate the call.
 - .8 The two-way communications means shall provide on demand to authorized personnel, information that identifies the building location and elevator number and that assistance is required.
 - .9 Provide all wiring necessary for the complete installation of the system from the device in the elevator to an externally located terminal in the elevator machine room. Connect to the telephone line. Contractor is responsible to ensure that the communication system functions as required including any work necessary to the building elevator phone line.
 - .10 The two-way communications means shall not use a handset in the car.
 - .11 If the emergency communication means is connected to the building power supply, it shall automatically transfer to a source of standby or emergency power as required by the applicable building code, after the normal power fails. The power source shall be capable of providing for illumination of the visual indication within the car, and the means of emergency communications for at least 4 hours; and the audible signaling device for at least 1 hour.
-

2.57 Emergency Communications System In the Car Verification

- .1 Comply with Clause 2.27.1.1.6 of the B44 Code
- .2 Provide a minimum of one illuminated visual and audible signal for each group of elevators controlled by the Fire Recall Switch. Provide a stainless steel faceplate.
- .3 The visual signal is to be located at the designated landing in the vicinity of the Fire Recall Switch.
- .4 Provide all Bilingual engraving as required.

2.58 Bilingual Markings

- .1 Engrave all identification and instructions at least 0.25 mm deep on operating panels and on all signal equipment in both English and French except where design is such that inference is obvious and readily understood.
- .2 All car and hall position indicators to display bilingual identification matching bilingual car operating buttons.

2.59 Keys

- .1 Provide three (3) sets for each control device and four (4) sets of keys for Special Emergency Service.
 - .2 Provide six (6) high security Medico keys for **each** car call operating button.
 - .3 Organize keys on suitable key rings with permanently engraved tags, clearly identifying use. Tags to be approved by Departmental Representative.
-

PART 3 - EXECUTION

3.1 Workmanship

- .1 Install all equipment in a first class workmanship manner. Upon completion do all necessary repairs, cleaning, and painting as required to turn the equipment over in "New Condition".

3.2 Procedure

- .1 Ensure that all hoistway doors remain closed and locked during construction.
- .2 Provide permanently fastened solid barricades at each floor where work is being carried out.

3.3 Arrangement of Equipment

- .1 Arrange equipment in machine room so that the machine and controllers, and other equipment can be removed for repairs or replacement without dismantling or removing other equipment components.
- .2 Arrange equipment for clear passage.
- .3 Arrange equipment according to elevator shop drawings.
- .4 Accommodate equipment in provided space according to above mentioned requirements.

3.4 Welding

- .1 All welds shall be identified with the welder's identification stamp.
- .2 Field welding and cutting is not permitted.

3.5 Pit Equipment Arrangement

- .1 Arrange the pit equipment for convenient access and maintenance.

3.6 Erection of Hoistway Doors and Frames

- .1 Set hoistway doors in perfect alignment with car door and in true plumb with car guide rails.
 - .2 Erect hoistway doors and frames in accordance with labeling requirements.
 - .3 Securely fasten frames to structural supports.
 - .4 Dowel hoistway door pick up roller assemblies.
-

3.7 Surface Protection

- .1 Provide protective coverings for finished surfaces.

3.8 Limit Switches

- .1 Subsequent to the performance of safety tests and checks by the Inspecting Authorities, fasten final limit switches and brackets by through bolting or doweling.

3.9 Brake

- .1 Adjust brake to hold car cab plus 125% of the rated load.
- .2 After final adjustment of the brake and subsequent to the performance of safety tests and checks by the Inspecting Authorities, drill the brake spring nuts and rod and insert a cotter pin or seal to avoid incorrect or different adjustments in the future
- .3 Arrange the brake to stop the elevator with full load in the car from full speed in the down direction within the normal stopping distance of the car.

3.10 Car Balance

- .1 Check the static balance of the car.

3.11 Counterweight Balance

- .1 Check the static balance of the counterweight.
- .2 Check and adjust as required to ensure that the counterweight is equal to the complete elevator cab plus between 40 to 42.5% of the contract load.

3.12 Speed Variation

- .1 Adjust for speed variation as follows:
 - .1 When lifting rated load, do not permit car speed to vary from rated speed by more than 2%.
 - .2 When operating under varying normal conditions, i.e. rated load to no load, do not permit operating conditions to exceed 2%.

3.13 Operating Time

- .1 Adjust the equipment so that the elapsed time to travel one typical floor does not exceed 13.0 seconds in both directions.
- .2 Measure this time as follows:
 - .1 The time starts when the doors are fully closed and continues until the car is stopped level with the next floor.
 - .2 Floor level is considered to be within 6.35 mm of level.
 - .3 The time is measured with full load in the car and in both directions of travel.
 - .4 Adjust the equipment so that for other conditions of loading, the time does not vary more than five percent (5%).
 - .5 Adjust the equipment so that the operating time, as set out above, is compatible with dependable, consistent operation without undue wear or excessive maintenance and can be readily maintained over the life of the elevator installation.
 - .6 Adjust the equipment so that with the control adjusted to give the required time, the elevator operates under smooth acceleration and retardation and provides a comfortable and agreeable ride to the operator.

3.14 Ride Performance

- .1 Acceleration/Deceleration
 - .1 Adjust the equipment to allow the car to start, accelerate, decelerate and stop smoothly.

3.15 Inspections Field Tests and Commissioning

- .1 Furnish a competent personnel to assist the Departmental Representative during the inspection and testing of the systems. Make the appropriate corrections until final acceptance of the installation.
 - .2 The inspections will be carried out to ensure that the workmanship is in compliance with plans and specifications.
 - .3 Provide a minimum of ten working days notice to Departmental Representative for testing. Prior to giving notice the contractor shall test all systems to ensure proper operation.
 - .4 Perform all tests as required by the B44 Safety Code For Elevators and the Technical Standards and Safety Act 2000, O.Reg. 209/01.
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Inspections Field Tests and Commissioning - cont'd

- .5 In addition, upon completion of the elevator supply all personnel, instruments and devices required to perform the following:
 - .1 Test car and counterweight balance to verify specification requirements.
 - .2 Test the equipment under full load and no load to verify the speed variation performance requirements.
 - .3 Test door operating equipment to verify the performance requirements.
 - .4 Test the ride to verify the performance requirements.
 - .5 Test overload relays
 - .6 Perform all electrical readings and complete technical data forms required by the specifications.
 - .7 Upon completion of the elevator, furnish competent technicians and adjusters fully trained on the equipment installed to check and test all operating systems including but not limited to, special emergency service.

3.16 Cleaning and Painting

- .1 Upon completion thoroughly clean, remove all indications of rust and paint the following:
 - .1 Machine room equipment in Urethane Reinforced Enamel paint. Colour to be submitted to Departmental Representative for approval.
 - .2 Machine room floor Urethane Reinforced Floor Enamel to match Moore Paint colour Platinum Grey #112-74.
 - .3 Horizontal area of the refuge space on the car top in a contrasting colour.
 - .4 Car top and crosshead in rust resistant black paint.
 - .5 Counterweight frame and blocks in rust resistant yellow paint.
 - .6 Pit equipment, channels, and buffer supports in rust resistant black paint.
 - .7 Horizontal area of the refuge space in the pit in a contrasting yellow colour.
 - .8 All hoistway structural steel provided by this Section in rust resistant black paint.
 - .9 Car toe guard and steel channel behind toe guard black in colour.
-

3.17 Test Data Forms

- .1 After completion of the test, complete and submit test data forms to Departmental Representative. These forms shall be signed by the person responsible for the performance of the work.
- .2 Include a check list of all performance data such as speed, door times, operating times, flight times, and all settings of any adjustable device.
- .3 Provide copies of all TSSA Inspection Forms and Test Data Reports.

Elevator No.	
CAR SPEED UP (fpm)	
CAR SPEED DOWN (fpm)	
FLOOR TO FLOOR TIME UP (seconds)	
FLOOR TO FLOOR TIME DOWN (seconds)	
BRAKE TO BRAKE TIME UP (seconds)	
BRAKE TO BRAKE TIME DOWN (seconds)	
EMPTY CAR - RUNNING CURRENT UP (amps)	
EMPTY CAR - RUNNING CURRENT DOWN (amps)	
FULL LOAD - RUNNING CURRENT UP (amps)	
FULL LOAD - RUNNING CURRENT DOWN (amps)	
CAR DOOR OPEN TIME (seconds)	
CAR DOOR CLOSE TIME (seconds)	
CAR CALL DWELL TIME (seconds)	
HALL CALL DWELL TIME (seconds)	
NUDGING TIME OUT (seconds)	
DOOR CLOSING STALL FORCE (lbs)	
LEVELLING ACCURACY (")	
TYPE OF DOORS	
NUDGING TIME IN CODE ZONE DISTANCE (seconds)	
SAFETY SLIDE DISTANCE (inches)	
GOVERNOR OVERSPEED SWITCH TRIP (fpm)	
SAFETY APPLICATION TRIP SPEED (fpm)	
CAR CAB NOISE LEVEL - CAR RUNNING - FAN OFF	
TESTS PERFORMED BY:	DATE:

- .4 These forms shall be signed by the person responsible for the performance of the work.

End of Section