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## Introduction

The person who passes the exam can act as a guarantor for construction work included in subclass 14.1 - Contractor – passenger and freight elevators.

This competency profile is based on the scope of application of the *Building Act*, as well as on Section (21-22-23 or 24) of the *Regulation respecting the professional qualification of contractors and owner-builders*.

## Subclass definition

### 14.1 - Contractor – Passenger and freight elevators

This subclass authorizes construction work that is not exclusively reserved for electrical contractors relating to passenger and freight elevators, dumbwaiters, escalators, moving walks and material lifts governed by the current edition of CAN/CSA B44 “Safety Code for Elevators and Freight Elevators,” rendered applicable by Chapter IV of the Construction Code approved by Decree no. 895-2004 of September 22, 2004, and defined in that code, and related construction work.<sup>1</sup>

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<sup>1</sup> In this document, the term “passenger and freight elevators” refers to all devices covered by the CAN/CSA-B44 standard.

## **Module 1 – DEFINITIONS AND TYPES OF SYSTEMS**

Elements of competency covered in this module:

1. Define concepts and terms relating to passenger and freight elevator installations
2. Describe the characteristics and operating principles of various passenger and freight elevator installations



## Module 1 – DEFINITIONS AND TYPES OF SYSTEMS

Elements of competency	Skills required
<b>1. Define concepts and terms relating to passenger and freight elevator installations</b>	1.1. Define the terms passenger elevator, freight elevator, dumbwaiter, escalator, moving walk, material lift, etc.
	1.2. Define terms related to passenger and freight elevator components and installation: shaft, guide, platform, car safety, car frame, controller, cogged belt, damper, etc.
	1.3. Define terms related to escalator and moving walk components and installation: balustrade, handrail, chain, etc.
	1.4. Define driving machine types: suspension cable, rack and pinion, screw and nut, hydraulic, cable pinion and modular cable
	1.5. Distinguish between the different types of load on passenger and freight elevators: nominal, static, suspension, impact, etc.
	1.6. Define the units of measurement associated with passenger and freight elevators (speed, mass, etc.)
<b>2. Describe the characteristics and operating principles of various passenger and freight elevator installations</b>	2.1. Describe the different types of passenger and freight elevator components and explain their field of application (dampers, cables, controllers, safety devices, etc.)
	2.2. Explain the operating principles of different passenger and freight elevators: hydraulic (type of piston, etc.) and electrical (type of drive, geared or gearless, etc.)
	2.3. Explain the operating principles of escalators and moving walks
	2.4. Explain the uses of the different types of electrical conductors used in passenger and freight elevator installations

Elements of competency	Skills required
	2.5. Describe and explain the features of normal and emergency power sources to which passenger and freight elevators can be connected (power circuits, accumulators and generators)
	2.6. Describe the features and operation of an elevator for firefighters' use (NBC 95 and B44) in terms of fire prevention (BGH)
	2.7. Explain the requirements for passenger and freight elevator behaviour in the event of fire
	2.8. Explain the requirements for the use of passenger elevators by persons with physical disabilities (barrier-free design)

## **Module 2 – LEGISLATIVE, NORMATIVE AND REGULATORY FRAMEWORK**

Elements of competency covered in this module:

3. Situate work related to passenger and freight elevator installations in relation to various codes, regulations and standards

## Module 2 – LEGISLATIVE, NORMATIVE AND REGULATORY FRAMEWORK

Elements of competency	Skills required
<p><b>3. Situate work related to passenger and freight elevator installations in relation to various codes, regulations and standards</b></p>	<p>3.1. Identify the certification standards prescribed by current regulations for passenger and freight elevator components (CSA, UL, ASME, WH)</p>
	<p>3.2. Explain the impact of Bill 72, <i>An Act to amend the Environment Quality Act and other legislative provisions with regard to land protection and rehabilitation</i> in relation to the use of hydraulic systems (soil protection and decontamination)</p>
	<p>3.3. Explain the impact of the <i>Act respecting labour relations, vocational training and manpower management in the construction industry</i> (R.S.Q., c. R-20, a. 20) and the <i>Regulation respecting the application of the Act respecting labour relations, vocational training and manpower management in the construction industry</i> (R.S.Q. c. R-20, r.1) on the installation of passenger and freight elevators</p>
	<p>3.4. Explain the impact of the <i>Act respecting manpower vocational training and qualification</i> (R.S.Q., c. F-5, a. 30) and the <i>Regulation respecting manpower vocational training and qualification for the trades of electrician, pipefitter, elevator mechanic and electrical machine operator in sectors other than construction</i> (R.S.Q. c. F-5, r.4) on the installation of passenger and freight elevators</p>
	<p>3.5. Explain the links between the various laws, regulations and standards governing</p>

Elements of competency	Skills required
	elevator installation work ( <i>Building Act, Construction Code, Chapter IV, B44, NBC 95, municipal regulations, etc.</i> )
	3.6. Explain the scope of the standard ( <i>CAN/CSA B-44</i> ) as it applies to work in relation to passenger and freight elevator installations
	3.7. Identify and define the application of the <i>Québec Construction Code, Chapter I: Building</i> in relation to work on passenger and freight elevators
	3.8. Identify and define the application of the <i>Québec Construction Code, Chapter III: Plumbing</i> in relation to work on passenger and freight elevators (French drains)
	3.9. Identify and define the application of the <i>Québec Construction Code, Chapter IV: Elevators and Other Elevating Devices</i>
	3.10. Identify and define the application of the <i>Québec Safety Code, Chapter IV: Elevators and Other Elevating Devices</i>
	3.11. Recognize the scope of the <i>Canadian Electrical Code</i> (Section 38) and the <i>Construction Code, Chapter V: Electricity</i> , in relation to the installation of passenger and freight elevators
	3.12. Recognize the scope of the <i>National Fire Code</i> (NFC) in relation to passenger and freight elevator work
	3.13. Explain the importance of <i>CSA W59-03 Welded Steel Construction (Metal Arc Welding)</i> for passenger and freight elevator installation work, define the mission of the

Elements of competency	Skills required
	Canadian Welding Bureau and the certification process

## **Module 3 – PLANS, SPECIFICATIONS AND ESTIMATES**

Elements of competency covered in this module:

4. Estimate installation and alteration work based on plans and specifications for passenger and freight elevators
5. Estimate repair and maintenance work on existing passenger and freight elevators



## Module 3 – PLANS, SPECIFICATIONS AND ESTIMATES

Elements of competency	Skills required
<p><b>4. Estimate installation and alteration work based on plans and specifications for passenger and freight elevators</b></p>	<p>4.1. List the types of plans issued for tendering purposes and the sections of specifications that concern passenger and freight elevator installations (architectural, mechanical)</p>
	<p>4.2. Locate and interpret elements on a plan (dimensions, annotations, notes, symbols) relating to the installation of passenger and freight elevators (shaft dimensions, concrete, etc.)</p>
	<p>4.3. Interpret general and specific specifications for passenger and freight elevator installations</p>
	<p>4.4. Choose a passenger or freight elevator that meets the requirements of the plans and specifications issued for tendering purposes (based on intended use and traffic)</p>
	<p>4.5. Ensure availability, delivery times and prices of the identified passenger or freight elevator</p>
	<p>4.6. Determine required resources (labour, equipment, materials) and productivity rate</p>
	<p>4.7. Complete, check and submit the bid</p>
<p><b>5. Estimate repair and maintenance work on existing passenger and freight elevators</b></p>	<p>5.1. Evaluate the characteristics of a passenger or freight elevator (use, equipment, electricity, compliance)</p>
	<p>5.2. Determine and propose modifications for a vertical transport system</p>
	<p>5.3. Ensure parts availability, delivery times and prices</p>
	<p>5.4. Determine required resources (labour, equipment, materials) and productivity rate</p>
	<p>5.5. Ensure compliance of the materials and work proposed and compatibility of components with the appropriate standards</p>

Elements of competency	Skills required
	5.6. Complete, check and submit the bid

## **Module 4 – STANDARDS AND EXECUTION OF WORK**

### Elements of competency covered in this module:

6. Plan work in relation to the installation of passenger and freight elevators
7. Ensure proper interpretation of plans and drawings for passenger and freight elevator installations
8. Manage the execution of work to install or alter a passenger or freight elevator in accordance with current standards
9. Manage the handling and installation of escalators and moving walks in accordance with current standards
10. Repair, inspect and maintain passenger and freight elevators and escalators in compliance with current standards
11. Ensure health and safety in connection with installation and maintenance work on passenger and freight elevators

## Module 4 – STANDARDS AND EXECUTION OF WORK

Elements of competency	Skills required
<b>6. Plan work in relation to the installation of passenger and freight elevators</b>	6.1. Plan installation method in accordance with manufacturer’s recommendations and current regulations
	6.2. Ensure availability of lifting devices and scaffolding
	6.3. Explain the importance of properly coordinating the interface (common boundaries) between the various disciplines on the site
<b>7. Ensure proper interpretation of plans and drawings for passenger and freight elevator installations</b>	7.1. Ensure that plans and specifications are signed by an engineer before work begins
	7.2. Transmit drawings and specifications required to complete the work to the various parties involved
	7.3. Explain the particulars of the work as specified on plans (symbols, dimensions, annotations, sections, details)
	7.4. Produce installation or modification sketches, as required
<b>8. Manage the execution of work to install or alter a passenger or freight elevator in accordance with current standards</b>	8.1. Deliver and move materials and equipment on site
	8.2. Identify the right location for the various work (electricity, concrete, mechanical room, etc.)
	8.3. Provide work tools and communicate safe ways of using them
	8.4. Make sure mechanics understand installation steps
	8.5. Resolve technical, coordination and other difficulties as work progresses
	8.6. Control quality during construction and once installation is complete

Elements of competency	Skills required
	8.7. Ensure that passenger and freight elevator parameters are adjusted (speed, etc.)
	8.8. Check the power supply from the disconnect switch to the controller (amperage, wire size, etc.)
	8.9. Ensure that no unauthorized modifications are made to the integrity of the walls, fire separations and structure
	8.10. Ensure that all work related to the installation of the passenger or freight elevator is completed prior to start-up (electricity, etc.)
	8.11. Ensure the start-up of passenger and freight elevator (Carry out commissioning tests and trials in compliance with the <i>Construction Code</i> [R.S.Q. c. B-1.1, r.0.01.01])
	8.12. Explain the requirements for installing hydraulic versus traction passenger and freight elevators
	8.13. Explain the requirements for installing passenger and freight elevators with or without a shaft (panoramic)
	8.14. Ensure that instruction and maintenance manuals are given to the owner or the owner's representative
	8.15. Ensure that work complies with standards, plans and manufacturer's specifications
	8.16. Ensure that the declaration of work required for passenger and freight elevator work is filed
9. <b>Manage escalator and moving walk maintenance and installation work, in compliance with current standards</b>	9.1. Be aware of the environmental conditions in which the escalator or moving walk will be used (floor resistance, path, etc.)
	9.2. Ensure correct calculation and positioning of loads on equipment (rolling points, roller size, etc.)

Elements of competency	Skills required
	9.3. Ensure that handling equipment corresponds to calculations and identified loads
	9.4. Ensure that equipment slinging is in accordance with calculated anchor points and drawings
	9.5. Evaluate the impact of the route and take any necessary steps if applicable (obtain permits, knock down walls, etc.)
	9.6. Make sure mechanics understand installation steps (transport, assembly, slinging, lifting, etc.)
	9.7. Provide work tools and communicate safe ways of using them
	9.8. Resolve technical, coordination and other difficulties as work progresses
	9.9. Control quality during construction and once installation is complete
	9.10. Ensure the adjustment of escalator or moving walk parameters (speed, etc.)
	9.11. Check the power supply from the disconnect switch to the controller (amperage, wire size, etc.)
<b>10. Manage the handling and installation of escalators and moving walks in accordance with current standards</b>	10.1. Ensure escalator or moving walk start-up (perform commissioning tests and trials in compliance with the <i>Construction Code</i> . Check adjustment and safety)
	10.2. Ensure that no unauthorized modifications are made to the integrity of the walls, fire separations and structure
	10.3. Ensure that instruction and maintenance manuals are given to the owner or the owner's representative

Elements of competency	Skills required
	10.4. Ensure that work complies with standards, plans and manufacturer's specifications
	10.5. Ensure that the required declaration of work is filed for escalator or moving walk work
<b>11. Repair, inspect and maintain passenger and freight elevators in compliance with current standards</b>	11.1. Diagnose a malfunction on a passenger or freight elevator (for different types of vertical conveyors, etc.)
	11.2. Provide a solution to repair a passenger or freight elevator (dismantle, reassemble, adjust parts, etc.)
	11.3. Explain the requirements for inspecting and maintaining passenger and freight elevators (standards, manufacturers, engineers)
	11.4. Propose an appropriate maintenance program for the device in compliance with the <i>Safety Code</i> (R.S.Q. c. B-1.1, r.0.01.01.1)
	11.5. Follow up on a periodic maintenance schedule for a passenger or freight elevator
	11.6. Describe how to perform tests and checks (visual, electrical, etc.)
	11.7. Ensure calibration, maintenance and replacement of components (including machining of parts if required)
	11.8. Explain the dangers involved in using a passenger or freight elevator and the conditions that require it to be taken out of service
	11.9. Ensure production of maintenance and repair reports (logbook)
<b>12. Ensure health and safety in connection with installation and maintenance work on</b>	12.1. Identify the risks associated with the installation and maintenance of passenger or freight elevators (confined space, height, movement, handling, etc.)

Elements of competency	Skills required
<b>passenger and freight elevators</b>	12.2. Explain the precautions to be taken when installing and maintaining a passenger or freight elevator
	12.3. Explain precautions to be taken in connection with hazardous materials (WHMIS)
	12.4. Ensure the safe installation and use of scaffolding and lifting equipment