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## Introduction

Successful candidates may act as guarantors for construction work included in subclass 13.2 - Contractor – Fire alarm systems.

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

### **13.2 - Contractor – Fire alarm systems**

This subclass authorizes construction work that is not exclusively reserved for electrical contractors relating to fire alarm systems, and similar or related construction work.

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

Elements of competency covered in this module:

1. Define and explain concepts and terms related to fire alarm systems
2. Describe the characteristics and operating principles of various fire alarm systems



## Module 1 – DEFINITIONS AND TYPES OF SYSTEMS

Elements of competency	Skills required
<p><b>1. Define and explain concepts and terms related to fire alarm systems</b></p>	<p>1.1. Define “fire alarm system” and one-way or two-way (regular and emergency) “voice communication system”</p> <p>1.2. Define “central alarm and control station” for a high-rise building</p> <p>1.3. Define “visual signal device,” “audible signal device,” “manual fire alarm” and “annunciator”</p> <p>1.4. Define concepts and distinguish between different types of fire detectors, such as “smoke detectors,” “heat detectors” and “air duct smoke detectors”</p> <p>1.5. Define concepts and distinguish between “alarm signal,” “alert signal,” “supervisory signal” and “trouble signal”</p> <p>1.6. Define concepts and differentiate between different types of devices such as “transceivers,” “safety devices” and “monitoring devices”</p> <p>1.7. Explain the difference between a “smoke alarm” and a “smoke detector”</p> <p>1.8. Define the concepts associated with the installation of a fire alarm system: power source, different types of circuits (class A circuit, class B circuit, input circuit, etc.)</p> <p>1.9. Identify the units of measurement associated with fire alarm systems (dBA, mm, m<sup>2</sup> and °C)</p>
<p><b>2. Describe the characteristics and operating principles of various fire alarm systems</b></p>	<p>2.1. Define and explain the operation of the most common types of fire alarm system design on the market (conventional [input and output circuits], addressable [data links] and semi-addressable [combination of input circuits and support devices])</p>

Elements of competency	Skills required
	2.2. Explain the operating modes of fire alarm systems and their applications, as prescribed by the <i>Québec Construction Code, Chapter I: Building</i> (single signal and double signal, depending on the type of occupancy)
	2.3. Explain the different types of voice communication systems, how they work and their field of application
	2.4. Describe the types of components in a fire alarm system (devices and control stations) and their characteristics (performance, etc.)
	2.5. Describe the types of cable prescribed by current regulations for installation in a fire alarm system, and specify their scope of application in the context of combustible, non-combustible and high-rise building applications
	2.6. Describe the various approved cables for fire alarm system installation and their characteristics (FT-1 @ FT-4, FAS...)
	2.7. Describe and identify the scope of application of the various signalling devices used in fire alarm systems
	2.8. Describe and explain the features of normal and emergency power sources to which fire alarm systems can be connected (distribution circuits, accumulators and generators)
	2.9. Describe the types and operation of a “central alarm and control station” for high-rise buildings

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

Elements of competency covered in this module:

3. Situate work related to fire alarm systems in relation to current regulations, codes and standards

## Module 2 – LEGISLATIVE, NORMATIVE AND REGULATORY FRAMEWORK

Elements of competency	Skills required
<p><b>3. Situate work related to fire alarm systems in relation to current regulations, codes and standards</b></p>	<p>3.1. Know how to recognize the organizations that affix their approval marks to fire alarm system components in order to guarantee compliance (ULC, CSA, ULC)</p>
	<p>3.2. Recognize the scope of the <i>Québec Construction Code, Chapter I: Building</i> and the <i>National Building Code of Canada: 1995</i> (amended) (NRC) in relation to fire alarm systems</p>
	<p>3.3. Recognize the scope of the work performed under their licence and that of others (master electricians)</p>
	<p>3.4. Master the principles of cross-referencing and/or referencing other regulations from the <i>Québec Construction Code, Chapter I: Building (Canadian Electrical Code-Part I, 18th edition, CAN/ULC-S524, etc.)</i></p>
	<p>3.5. Identify the various standards that apply to work on fire alarm systems and their scope (installation standards, such as <i>CAN/ULC-S524, S537, S536</i>)</p>
	<p>3.6. Explain the importance of consulting the competent authority (RBQ for regulated buildings, municipalities for small buildings and others) regarding specific requirements related to the installation of fire alarm systems</p>

## Module 3 – PLANS AND SPECIFICATIONS

Elements of competency covered in this module:

4. Read and interpret fire alarm system plans and drawings
5. Read and interpret the divisions of specifications relating to fire alarm systems
6. Adapt drawings and plans to reflect as-built work



## Module 3 – PLANS AND SPECIFICATIONS

Elements of competency	Skills required
<b>4. Read and interpret fire alarm system plans and drawings</b>	4.1. List the types of drawings that concern fire alarm systems (architecture, single-line, etc.)
	4.2. Locate on a plan the various elements of a fire alarm system
	4.3. Interpret a chart identifying the symbols used for fire alarm systems
	4.4. Locate, read and interpret the main dimensions and annotations associated with fire alarm systems
	4.5. Locate, read and interpret cross-sections and details associated with fire alarm systems
	4.6. Read and interpret general notes and tables associated with fire alarm systems
	4.7. Prepare the quantity survey <sup>1</sup> (wiring, number of components, etc.)
	4.8. Read and interpret shop drawings and single-line plans
<b>5. Read and interpret the divisions of specifications relating to fire alarm systems</b>  <b>(1995 17-division normative specifications with reference to the new 2004 49-division specifications)</b>	5.1. Identify the divisions and sections of construction specifications associated with fire alarm systems
	5.2. Interpret information relating to fire alarm systems in the general terms and division 01 of specifications
	5.3. Interpret information in specifications relating to fire alarm systems (1995 division 16; 2004 divisions 26 to 28)
	5.4. Interpret electrical and other specialty specifications (e.g., sprinkler ventilation, emergency generator, elevator) relating to fire alarm systems (connections, wiring, etc.)
	6.1. Identify the information required in an as-built drawing or plan

<sup>1</sup> 2 Prepare the quantity survey: measure the structure and calculate the quantities of materials required.

Elements of competency	Skills required
<b>6. Adapt drawings and plans to reflect as-built work</b>	6.2. Adapt basic drawings and plans to reflect as-built work
	6.3. Explain the approval process for as-built plans and drawings
	6.4. Ensure that as-built plans and drawings comply with appropriate standards

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

Elements of competency covered in this module:

7. Plan and organize work in relation to fire alarm systems
8. Install fire alarm systems
9. Start up a fire alarm system
10. Maintain fire alarm systems
11. Ensure health and safety in connection with fire alarm system installation work

## Module 4 – STANDARDS AND EXECUTION OF WORK

Elements of competency	Skills required
<b>7. Plan and organize work in relation to fire alarm systems</b>	7.1. Determine the logical order of execution of fire alarm system installation and maintenance work
	7.2. Explain the importance of properly managing the interface (common boundaries) between the various disciplines on the site
	7.3. Ensure that the required authorizations and permits for work in relation to fire alarm systems are obtained
	7.4. Order and receive materials required for the installation of a fire alarm system
<b>8. Install fire alarm systems</b>	8.1. Evaluate whether the installation site conforms to the initial design and follow up if necessary
	8.2. Provide appropriate and compliant cable runs and adequate clearances for devices and other system components
	8.3. Install the control station housing in accordance with current standards and the manufacturer's recommendations
	8.4. Install main ducts and wiring in accordance with current standards and manufacturer's recommendations (methods, combustible or non-combustible building, ductwork, piping, etc.)
	8.5. Install outlet boxes in accordance with current standards
	8.6. Install devices and connect them to each other and to the control station
	8.7. Ensure proper surface patching and integrity of walls and fire separations (name materials and methods used)
	8.8. Explain the requirements for the location of fire detectors in relation to detector types, ceilings and site morphology

Elements of competency	Skills required
	8.9. Explain the particularities of installing central alarm and control stations in high-rise buildings
	8.10. Explain the requirements for fire resistance in high-rise buildings and their impact on the installation of the fire alarm system
	8.11. Explain the particularities of operating a voice communication network (audibility, intelligibility) in high-rise buildings
	8.12. Interface between fire alarm system and sprinkler system components (water flow indicators and monitoring devices)
	8.13. Explain the various restrictions on the installation of audible signal devices in homes and dwellings
	8.14. Explain the operation and application of isolator modules in systems with data links (addressable loops)
	8.15. Explain and implement the links between the fire alarm system and the various auxiliary devices (generator, fire pump, electromagnetic lock, ventilation system, elevator recall, etc.)
	8.16. Ensure compliance with electrical standards (maximum voltage drop, supply voltage, cable gauge, signal circuits, etc.)
<b>9. Start up a fire alarm system</b>	9.1. Check that the fire alarm system is properly installed and complies with standards and plans and specifications
	9.2. Be aware of the requirements of users, the owner and the authority having jurisdiction
	9.3. Program the fire alarm system according to the various parameters determined
	9.4. Ensure testing of all fire alarm system components in compliance with <i>CAN/ULC-S537</i> (wiring continuity, grounding, alarm condition, installation)

Elements of competency	Skills required
	9.5. Explain the requirements for setting up large-scale fire alarm systems
	9.6. Ensure that the required manuals and certificates are given to the owner or the owner's representative
<b>10. Maintain fire alarm systems</b>	10.1. Name the types of tests associated with fire alarm systems (visual, etc.) and the components to be tested, as prescribed by the standard ( <i>CAN/ULC-S536</i> ) and by the manufacturer
	10.2. Identify precautions to be taken with regard to building occupants prior to system inspection
	10.3. Ensure that initial building occupancy conditions are the same as when the system was installed
	10.4. Carry out system assessment in compliance with <i>CAN/ULC-S536</i> standard
	10.5. Produce an inspection report on the condition of the system
	10.6. Replace fire alarm system devices and components if necessary
	10.7. Add components as required, connect them to the system and carry out testing
<b>11. Ensure health and safety in connection with fire alarm system installation work</b>	11.1. Identify the risks associated with the installation and maintenance of a fire alarm system
	11.2. Explain the precautions to be taken when installing and maintaining a fire alarm system
	11.3. Identify manufacturers' additional requirements for the safe use of fire alarm systems