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Introduction

Successful candidates may act as guarantors for construction work included in subclass 13.3 - Contractor – Fire extinguishing 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

13.3 - Contractor – Fire extinguishing systems

This subclass authorizes construction work that is not exclusively reserved for master pipe-mechanics relating to automatic water-based fire extinguishing systems, fire protection standpipe, and similar or related construction work.

Module 1 – DEFINITIONS AND TYPES OF SYSTEMS

Elements of competency covered in this module:

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



Module 1 – DEFINITIONS AND TYPES OF SYSTEMS

Elements of competency	Skills required
1. Define concepts and terms related to fire extinguishing systems	1.1. Define “water-based fire extinguishing system,” “sprinkler system” and “standpipe”
	1.2. Define “ground floor,” “calculation area” or “application surface” and “risk” (low, ordinary, high)
	1.3. Define “residual pressure,” “static pressure,” “hose connection,” “fire-hose stations” and “hose cabinet”
	1.4. Define “control valve,” “damper,” “fast-response sprinkler,” “fuel piping,” “flow meter,” “pressure gauge,” “riser” and “main”
	1.5. Define “fire-department pumper connection,” “fire hydrant” and “fire pump”
	1.6. Define the concepts associated with the installation of a fire extinguishing system: public corridor, spacing, ceiling height, surface area, fire separation and firewall, fire detection and alarm system
	1.7. Define the different types of fire extinguishing system inspection: annual, five-yearly, etc.
	1.8. Identify the units of measurement associated with fire extinguishing systems (L/s, kPa, ft ² , lb/in ² , USGPM, etc.)
	1.9. Define the main classes of goods to be protected (I, II, III, IV) and the plastics groups (A, B and C)
	1.10. Define storage modes (full stack, pallet, shelf, island) that can have an impact on the installation of fire extinguishing systems

Elements of competency	Skills required
	1.11. Define the types of shelving (single, double and multiple) that can have an impact on the installation of fire extinguishing systems
2. Describe the characteristics and operating principles of various fire extinguishing systems	2.1. Explain the different types of sprinkler systems, their operation and field of application (underwater, dry, pre-action, deluge and cyclic systems)
	2.2. Explain the different classes of standpipe (1, 2, 3), how they work and their field of application
	2.3. Describe the types of components used in water-based fire extinguishing systems (sprinkler head, valve, damper, etc.), their characteristics and field of application
	2.4. Describe the materials used for fire extinguishing system piping (steel, plastic, copper) and their application
	2.5. Describe the equipment and supply sources to which fire extinguishing systems can be connected (reservoir, public water supply system)
	2.6. Explain the colour coding of sprinklers based on different temperature requirements

Module 2 – LEGISLATIVE, NORMATIVE AND REGULATORY FRAMEWORK

Elements of competency covered in this module:

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

Module 2 – LEGISLATIVE, NORMATIVE AND REGULATORY FRAMEWORK

Elements of competency	Skills required
3. Situate work related to fire extinguishing systems in relation to current regulations, codes and standards	3.1. Identify the organizations (and their compliance standards) that affix their marks to automatic extinguishing system components to guarantee compliance (ULC, ULc, FM)
	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 the installation of fire extinguishing systems
	3.3. Define the scope of the <i>National Fire Code of Canada 1995</i> , as it applies to the installation and maintenance of fire extinguishing systems
	3.4. Explain the impact of municipal regulations (and other competent authorities) on the installation of fire extinguishing systems
	3.5. Identify the various standards, and specify their scope of application, in the case of work in relation to fire extinguishing systems (<i>National Fire Protection Association [NFPA]</i>) (NFPA 13, NFPA 14 series)

Module 3 – PLANS AND SPECIFICATIONS

Elements of competency covered in this module:

4. Read and interpret fire extinguishing system elements on drawings and plans
5. Read and interpret the divisions of specifications for fire extinguishing systems
6. Produce shop drawings, if required, from plans and specifications issued for construction
7. Adapt drawings and plans to reflect as-built work



Module 3 – PLANS AND SPECIFICATIONS

Elements of competency	Skills required
<p>4. Read and interpret fire extinguishing system elements on drawings and plans (Plans and drawings issued for tendering and issued for construction)</p>	<p>4.1. Identify the types of plans that concern fire extinguishing systems</p> <p>4.2. Locate the elements of a fire extinguishing system on a plan</p> <p>4.3. Interpret a chart identifying the symbols used for fire extinguishing systems</p> <p>4.4. Locate, read and interpret the main dimensions and annotations associated with fire extinguishing systems</p> <p>4.5. Locate, read and interpret cross-sections and details associated with fire extinguishing systems</p> <p>4.6. Read and interpret general notes and tables associated with fire extinguishing systems</p>
<p>5. Read and interpret the divisions of specifications for fire extinguishing systems (1995 17-division MasterFormat normative specifications with reference to the new 2004 49-division MasterFormat specifications)</p>	<p>5.1. Identify the divisions and sections of construction specifications associated with fire extinguishing systems</p> <p>5.2. Interpret information relating to fire extinguishing systems in the general terms and division 01 of specifications</p> <p>5.3. Interpret electricity-related information in specifications for fire extinguishing systems (connections, monitoring devices, etc.) (1995 division 16; 2004 division 26)</p> <p>5.4. Interpret fire extinguishing systems information in specifications (1995 divisions 13 or 15; 2004 division 21)</p>
<p>6. Produce shop drawings, if required, from plans and</p>	<p>6.1. Explain the shop drawing approval process</p> <p>6.2. Ensure that shop drawings comply with plans and specifications</p>

Elements of competency	Skills required
specifications issued for construction	6.3. Ensure that shop drawings comply with appropriate standards
7. Adapt drawings and plans to reflect as-built work	7.1. Identify the information required in an as-built drawing or plan
	7.2. Adapt basic drawings and plans to reflect as-built work
	7.3. Explain the approval process for as-built plans and drawings
	7.4. Ensure that as-built plans and drawings comply with appropriate standards

Module 4 – RISK ASSESSMENT AND ESTIMATION

Elements of competency covered in this module:

8. Identify a risk and propose a technical solution for an existing building (without plans and specifications)
9. Estimate work based on plans and specifications issued for tendering purposes

Module 4 – RISK ASSESSMENT AND ESTIMATION

Elements of competency	Skills required
8. Identify a risk and propose a technical solution for an existing building (without plans and specifications)	8.1. Assess the existing system's capacity based on a change in risk
	8.2. Determine the risk types in accordance with the main uses of a building and the goods to be protected
	8.3. Identify design criteria to determine the number and location of required components (sprinkler heads, elbows, pipes and ducts, pumps, etc.)
	8.4. Explain the basics of hydraulic calculation (friction and lift losses)
	8.5. Explain the criteria used to determine whether a pump is required
	8.6. Propose a technical solution based on a risk, a building and the goods to be protected
	8.7. Produce installation sketches and shop drawings, as required
	8.8. Ensure that the work proposed complies with appropriate standards
9. Estimate work based on plans and specifications issued for tendering purposes	9.1. Validate the main design criteria of the plans and specifications issued for tendering purposes
	9.2. Ensure that hydraulic calculations produced make it possible to specify design criteria
	9.3. Measure quantities (pipes and ducts, number of components, etc.) ¹

Module 5 – STANDARDS AND EXECUTION OF WORK

Elements of competency covered in this module:

10. Plan and organize work in relation to fire extinguishing systems

¹ Prepare the quantity survey: measure the structure and calculate the quantities of materials required.

11. Install and modify sprinkler systems
12. Install and modify standpipe systems
13. Maintain fire extinguishing systems
14. Ensure health and safety in connection with fire extinguishing system installation work

Module 5 – STANDARDS AND EXECUTION OF WORK

Elements of competency	Skills required
10. Plan and organize work in relation to fire extinguishing systems	10.1. Explain the importance of properly coordinating the interface (common boundaries) between the various disciplines on the site
	10.2. Apply the requirements related to freeze protection
	10.3. Ensure that the required authorizations and permits for work in relation to fire extinguishing systems are obtained
	10.4. Order and receive the materials required for the installation of a fire extinguishing system (comply with manufacturer's specifications, etc.)
	10.5. Determine the logical order of execution of fire extinguishing system installation work
11. Install and modify sprinkler systems	11.1. Evaluate whether the installation site conforms to the initial design and follow up if necessary
	11.2. Provide adequate clearances for pipes, sprinklers and other system components
	11.3. Install the main duct and secondary piping in accordance with current standards and manufacturer's recommendations (type of supports, spacing, attachment to structure, etc.)
	11.4. Install equipment (valve, damper, flow sensor, valve monitoring device)
	11.5. Adjust sprinklers in accordance with obstructions and ceiling heights
	11.6. Install suitable devices for connecting the alarm system
	11.7. Set up a fire pump
	11.8. Implement earthquake-resistant bracing measures

Elements of competency	Skills required
	11.9. Explain the requirements for fuel piping and fire-department pumper connections
	11.10. Ensure connection of pipes to the water supply and connection of equipment to the electrical panel, in compliance with areas of responsibility
	11.11. Ensure surface levelling and integrity of firewalls and fire separations, where applicable
	11.12. Ensure proper display of system nameplate
	11.13. Install a cabinet for replacement sprinklers
	11.14. Perform system start-up tests (supply, pressure, open control valve, etc.)
	11.15. Ensure connection to water and emergency power supply
	11.16. Ensure that standards-related requirements are met
	11.17. Complete and forward the certificate of materials and tests to the owner or the owner's representative (duly signed, etc.)
	11.18. Ensure that instruction and maintenance manuals are given to the owner or the owner's representative
12. Install and modify standpipe systems	12.1. Evaluate whether the installation site conforms to the initial design and follow up if necessary
	12.2. Ensure adequate clearances for pipes and other system components
	12.3. Install risers, fire-hose stations and hose connections
	12.4. Install fire-department pumper connections

Elements of competency	Skills required
	12.5. Install standpipe cabinets
	12.6. Explain the requirements for hose connections and fire-hose stations
	12.7. Make sure all pipes are connected to the water supply and electrical panel, if applicable
	12.8. Ensure surface levelling and integrity of firewalls and fire separations, where applicable
	12.9. Carry out system start-up tests
	12.10. Ensure connection to water and emergency power supply
	12.11. Ensure that standards-related requirements are met
	12.12. Complete and forward the certificate of materials and tests to the owner or the owner's representative (duly signed, etc.)
	12.13. Ensure that instruction and maintenance manuals are given to the owner or the owner's representative
13. Maintain fire extinguishing systems	13.1. Name the components to be tested
	13.2. Notify building occupants and central monitoring station of system test
	13.3. Perform system checks and tests
	13.4. Issue a system audit certificate and make recommendations where appropriate
	13.5. Ensure periodic maintenance of a fire extinguishing system
	13.6. Replace fire extinguishing system components if necessary

Elements of competency	Skills required
14. Ensure health and safety in connection with fire extinguishing system installation work	14.1. Name the risks associated with installing and maintaining a fire extinguishing system (height, gas, confined space, spinning machine, etc.)
	14.2. Explain the precautions to be taken when installing and maintaining a fire extinguishing system
	14.3. Ensure the safe placement of scaffolding and lifting equipment