

Professional qualification of construction contractors

Competency profile

4.1 – Contractor – Masonry structures



This document was produced with the collaboration of the team of competency assessment advisors (Direction de la qualification) of the Régie du bâtiment du Québec.

In this document, the masculine gender is used without discrimination and solely for the sake of brevity.

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Introduction

The person who passes the exam can act as a guarantor for construction work included in subclass 4.1 - Contractor – Masonry structures.

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

4.1 - Contractor – Masonry structures

This subclass authorizes construction work relating to structural masonry and masonry outer walls.

It also authorizes construction work in subclass 4.2 of Schedule III.

Finally, it authorizes similar or related construction work.

Module 1 – DEFINITIONS AND TYPES OF STRUCTURES

Elements of competency covered in this module:

1. Define concepts and terms related to masonry structures
2. Define concepts relating to loads
3. Describe the main characteristics of masonry structures and their components



Module 1 – DEFINITIONS AND TYPES OF STRUCTURES

Elements of competency	Skills required
1. Define concepts and terms related to masonry structures	1.1. Define the concepts of “live load,” “dead load” and “bearing surface”
	1.2. Define “allowable deflection” (1/240; 1/360; 1/420, etc.)
	1.3. Define terms associated with masonry structures: anchoring, mortar, lintel, creep, etc.
	1.4. Explain the difference between a foundation wall that is “laterally supported” and one that is not laterally supported in small buildings (9.15. 4.2)
	1.5. List the characteristics of lime used in mortar (9.20.3.1)
	1.6. Explain the uses and specific properties of the mortar types defined by the Canadian standard (types M, N, S, O, R)
	1.7. Explain the factors that can have an influence as well as the means of controlling the quality of the mortar used on the site (homogeneity, wind drying, temperature, etc.)
2. Define concepts relating to loads	2.1. List the various loads that can act on a structure (snow, wind, earthquake, etc.)
	2.2. Explain the impact of a “lateral load” on a structure (causes, consequences, etc.)
	2.3. Explain the difference between a “concentrated load” and a “uniformly distributed load”
3. Describe the main characteristics of masonry structures and their components	3.1. Name the elements that make up the various structures and their functions
	3.2. Name the connections that ensure the stability of a structure

Elements of competency	Skills required
	3.3. Name the elements that make up bracing
	3.4. Name the various components that ensure the lateral stability of masonry structures

Module 2 – LEGISLATIVE, NORMATIVE AND REGULATORY FRAMEWORK

Elements of competency covered in this module:

4. Situate masonry structural work in relation to the various codes and standards in force

Module 2 – LEGISLATIVE, NORMATIVE AND REGULATORY FRAMEWORK

Elements of competency	Skills required
4. Situate masonry structural work in relation to the various codes and standards in force	4.1. Identify and define the use of the parts and sections of the <i>Quebec Construction Code - Chapter I, Building</i> applicable to masonry structural work
	4.2. Define the role of the <i>Canadian Standards Association (CSA)</i>
	4.3. Identify the various standards applicable to masonry structural work (CSA and others)
	4.4. Outline the scope of the various codes and standards applicable to masonry structural work (materials, building types, etc.)
	4.5. Describe the links between the various codes and standards specific to masonry structural work and the <i>Quebec Construction Code - Chapter I, Building</i> (organizational structure)

Module 3 – PLANS AND SPECIFICATIONS

Elements of competency covered in this module:

5. Read and interpret drawings and plans of structures (masonry)
6. Read and interpret the divisions of specifications for structures (masonry)



Module 3 – PLANS AND SPECIFICATIONS

Elements of competency	Skills required
5. Read and interpret drawings and plans of structures (masonry)	5.1. Locate the various elements of the various structures on a plan
	5.2. Locate masonry structural elements on a plan
	5.3. Explain the meaning of the main symbols used for drawings of masonry structures
	5.4. Locate, read and interpret the main dimensions and annotations of elements of masonry structures
	5.5. Locate, read and interpret cross-sections and details associated with elements of masonry structures
	5.6. Read and interpret general notes and tables associated with elements of masonry structures
	5.7. Locate, read and interpret dimensions, annotations, cross-sections and details associated with exterior walls
	5.8. Prepare the quantity survey ¹
	5.9. Read and interpret shop drawings for masonry structures
6. Read and interpret the divisions of specifications for structures (masonry) (1995 17-division system with reference to the new 2004 49-division system)	6.1. Define the divisions and sections of construction specifications associated with the structural elements of a building
	6.2. Interpret information relating to structural masonry and exterior walls in specifications
	6.3. Interpret information relating to masonry chimneys and fireplaces in specifications

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

Module 4 – STANDARDS AND EXECUTION OF WORK

Elements of competency covered in this module:

7. Plan and organize masonry work
8. Manage the execution of foundation work (masonry)
9. Manage the execution of above-ground masonry work (structure, outer walls)
10. Manage the execution of work on site-built masonry chimneys and fireplaces
11. Ensure quality control of masonry structural work
12. Ensure health and safety in relation to masonry work

Module 4 – STANDARDS AND EXECUTION OF WORK

Elements of competency	Skills required
7. Plan and organize masonry structural work	7.1. Communicate to the general contractor the limits of the work supplied by the masonry structures contractor
	7.2. Determine the stages and logical order of execution of masonry structural work
	7.3. Identify elements to be supplied by other disciplines but installed by the masonry structures contractor
	7.4. Explain the importance of properly coordinating the interface (common boundaries) between the various disciplines on the site
	7.5. Describe the characteristics of masonry structural projects that require plans and specifications
	7.6. Explain the process for modifying plans for masonry structures
	7.7. Explain how climatic conditions can affect structural masonry work
8. Manage the execution of foundation work (masonry)	8.1. Determine the thickness of foundation walls with a maximum unsupported height of 2.5 m in small buildings (9.15.4.1)
	8.2. Check that the width of the footings is compatible with the type of blocks used
	8.3. Explain the importance of foundation anchors
	8.4. Explain the characteristics of masonry walls supporting joists, beams and pilasters in small buildings (9.15.5)
	8.5. Explain the limitations of pilaster-type foundations for small buildings (9.15.2.4)
	8.6. State the height of the foundation wall above finished grade for small buildings (9.15.4.3)

Elements of competency	Skills required
	<p>8.7. State the conditions under which a reduction in the thickness of the upper part of the foundation wall is permitted in small buildings (floor joists and exterior masonry cladding) (9.15.4.4)</p> <p>8.8. Determine the concrete cover required for reinforcing bars in foundation walls</p> <p>8.9. Monitor concrete placement (mix, pour height, fall height, etc.)</p> <p>8.10. Make sure the concrete has cured in the open air (do not backfill too quickly to avoid cracking)</p>
<p>9. Manage the execution of above-ground masonry work (structure, outer walls)</p>	<p>9.1. Explain how to store and protect materials on site (unsoiled components, untouched mortar sand, non-hydrated lime, etc.)</p> <p>9.2. Determine precautions to be taken during masonry work (mortar temperature, weather) (9.20.14)</p> <p>9.3. Explain the dosages for preparing mortars and grouts (9.20.3.2)</p> <p>9.4. List the different qualities of masonry units used in load-bearing masonry on the market</p> <p>9.5. Plan the construction of templates for masonry arches and vaults</p> <p>9.6. Identify a maximum allowable deflection expressed in terms of a clear span (9.4.3)</p> <p>9.7. Determine minimum compressive strength of concrete blocks for use in small buildings (9.20.2.7)</p> <p>9.8. Identify elements that can act as masonry support lintels in small buildings (9.20.5.2)</p> <p>9.9. Determine the allowable span for steel lintels supporting an exterior masonry outer wall of a small building (9.20.5.2)</p>

Elements of competency	Skills required
	9.10. Determine the maximum height and thickness of unreinforced masonry walls for a small building (9.20.6)
	9.11. Explain cavity wall construction methods
	9.12. Explain masonry outer wall construction methods
	9.13. Explain the use of masonry support elements (spandrels, lintels) in the construction of veneered walls
	9.14. Explain the construction details relating to load-bearing masonry walls
	9.15. Explain the characteristics of mortar joints in small buildings (fired clay and concrete elements) (9.20.4)
	9.16. Explain the rules applicable to the drilling of structural masonry elements
	9.17. Explain the characteristics of masonry wall connections and fixings for a small building (9.20.9)
	9.18. Explain the characteristics of lateral supports in masonry structures (9.20.10)
	9.19. Explain the characteristics of roof, floor and wall anchors for masonry work (9.20.11)
	9.20. Explain the conditions that allow masonry corbelling in small buildings (9.20.12)
	9.21. Explain the waterproofing requirements for masonry work (9.20.13)
	9.22. Explain the characteristics of reinforcement in reinforced masonry work on small buildings (9.20.15)
	9.23. Explain the types, uses and arrangements of masonry reinforcement according to the market and specifications
9.24. Explain how to prevent corrosion of carbon steel fasteners in masonry work (galvanizing) (9.20.16)	

Elements of competency	Skills required
	9.25. Repoint existing facings (mortar types, cleaning, joint types, etc.)
	9.26. Explain the characteristics of masonry restoration work
	9.27. Explain the characteristics of natural stone outer walls
	9.28. Ensure the installation of the elements necessary for waterproofing the building
	9.29. Protect masonry structures and surfaces
10. Manage the execution of work on site-built masonry chimneys and fireplaces	10.1. Describe the characteristics of the walls of a masonry chimney under 12 metres high (9.21.4.8)
	10.2. Describe the characteristics of the walls of a site-built open fireplace (9.22.3)
	10.3. Determine the diameter of a circular flue and the cross-sections of a rectangular flue for an open fireplace (9.21.2.5)
	10.4. Explain clearance requirements for combustible materials (9.21.5 and 9.22.9)
	10.5. Explain construction methods for masonry chimneys (under and over 12 metres)
	10.6. Explain construction methods for open masonry fireplaces
	10.7. Explain how to seal the walls and joints of chimney flue linings
	10.8. Explain the requirements for lining chimneys and open fireplaces with various materials (firebrick, clay, etc.) (9.21.3 and 9.22.2)
	10.9. Explain the requirements for masonry chimney flue linings (mortar, installation, extension, etc.)
	10.10. Explain when it is not necessary to brace a chimney (9.21.4.5)

Elements of competency	Skills required
	10.11. Explain the requirements for chimney caps (9.21.4.6)
	10.12. Explain the requirements for the combustion chamber (9.22.5)
	10.13. Explain the requirements for registers and throats (9.22.6 and 9.22.7)
11. Ensure quality control of masonry work	11.1. List means of ensuring quality control of the work
	11.2. List the tests and trials to be carried out on materials used in the work
	11.3. Identify those responsible for the various stages of quality control of the work
	11.4. Ensure the quality of materials (upon receipt, but also according to optimal storage conditions)
	11.5. Solve problems in the execution of the work (solutions, schedule adjustments, etc.)
12. Ensure health and safety in relation to masonry work	12.1. Choose the scaffolding, taking into account the loads (bricks and blocks) to be applied and ensure that it is erected in compliance with safety standards (<i>Safety Code for the construction industry</i> , s. 3.9)
	12.2. Identify the measures to be taken to protect the public during masonry work (protection against falling masonry elements)
	12.3. List fall-arresting devices and require their use by workers, where applicable (<i>Safety Code for the Construction Industry</i> , ss. 2.9 and 2.10.12 and 3.8)
	12.4. Ensure safe use of lifting equipment