

COMPETENCY PROFILE

15.7 – Contractor – Residential Ventilation



CONTENTS SUBJECT TO MODIFICATION AT ANY TIME

We wish to thank the experts who contributed to work on this subclass (2021):

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Participants do so in a personal capacity and their opinions are not binding on the companies that recommended them.

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In this document, the masculine form has been used in a non-discriminating fashion, for the sole purpose of ensuring reading ease.

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DEFINITION OF THE SUBCLASS

15.7 – Contractor – Residential ventilation

This subclass authorizes construction work that is not reserved exclusively for master pipe-mechanics relating to air circulation or distribution systems related to ventilation, exhaust, air compensation and air conditioning of single family dwellings, duplexes or town houses and private portions of multifamily buildings held in divided co-ownership.

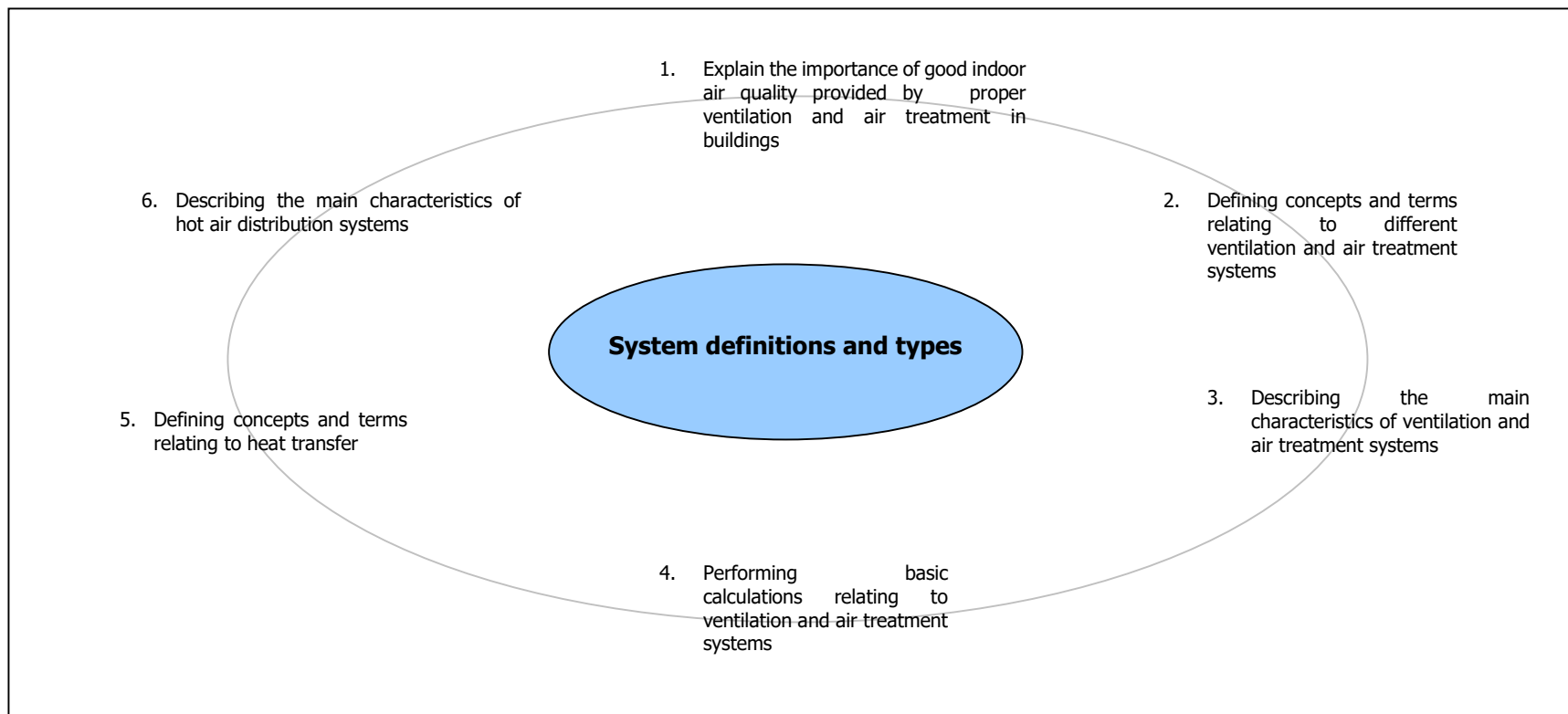
It also authorizes, for buildings referred to in the first paragraph, construction work relating to the heating duct systems and the installation of the heating devices of a pulsed air heating system as well as construction work relating to the heating duct systems of a pulsed air heating and air conditioning system.

In addition, this subclass authorizes, for the same buildings, construction work relating to the heating and air conditioning devices of a pulsed air system provided that the contractor also holds the appropriate subclass [15.9](#) or [15.10](#).

Lastly, it authorizes similar or related construction work.

SYSTEM DEFINITIONS AND TYPES

ELEMENTS OF COMPETENCE



SYSTEM DEFINITIONS AND TYPES

ELEMENTS OF COMPETENCE	MINIMUM SKILLS REQUIRED
1. Explaining the importance of good air quality provided by proper ventilation and air treatment in buildings	1.1. Explaining the concept of comfort and the elements that affect it
	1.2. Explaining the causes, symptoms and effects of poor ventilation on human beings
	1.3. Explaining the causes, symptoms and effects of poor ventilation on a building
	1.4. Explaining the behaviour of air flow (distribution) in a given space
	1.5. Explaining the behaviour of radon and how it can get into living spaces
2. Defining concepts and terms relating to different ventilation and air treatment systems	2.1. Distinguishing between the concept of “mechanical ventilation” and “natural ventilation”
	2.2. Identifying measurement units associated with ventilation
	2.3. Defining measurement units associated with the installation of ventilation and air treatment systems
	2.4. Defining the concepts of “minimum fresh airflow”, “exhaust airflow”, “depressurization”, “compensation”, “minimum fresh air capacity”, etc.
	2.5. Defining equipment connected to a ventilation system
	2.6. Defining a ventilation system’s components and accessories
	2.7. Defining ventilation types
	2.8. Defining the components of an exhaust system

ELEMENTS OF COMPETENCE	MINIMUM SKILLS REQUIRED
3. Describing the main characteristics of ventilation and air treatment systems	3.1. Naming the characteristics of materials used in ventilation ducts and their field of application
	3.2. Describing the types of assembly (joints) of elements in a network of ventilation ducts and specifying situations for their use
	3.3. Describing types of support and specifying situations for their use
	3.4. Explaining different modes relating to ventilation and air treatment systems
	3.5. Describing different types of air exhaust systems
	3.6. Explaining the impact of the operation of different types of air exhaust systems
	3.7. Describing the operation of different types of air distribution systems
	3.8. Describing the different types of ventilation and air treatment systems and their operation as well as their effects on cooling and heating systems
	3.9. Describing the fields of application and operation of limit switches on ventilation and air treatment systems
	3.10. Describing controls and their functions as well as the different control components and accessories of ventilation and air treatment systems
	3.11. Describing the characteristics of components of a radon exhaust system
	3.12. Interpreting a ventilation control diagram
	3.13. Explaining the effect of static pressure on the performance of different types of fans
	3.14. Describing elements likely to reduce and/or increase static pressure losses in an air distribution systems

ELEMENTS OF COMPETENCE	MINIMUM SKILLS REQUIRED
4. Performing basic calculations relating to ventilation and air treatment systems	4.1. Applying ventilation-specific formulas
	4.2. Converting units into the two measurement systems
	4.3. Performing calculations using trigonometry rules
	4.4. Calculating area, volume, velocity, flow, pressure and power
	4.5. Performing heat loss calculations
	4.6. Calculating air pressure drop using the equivalent length method
	4.7. Calculating heat gains using simple methods
5. Defining concepts and terms relating to heat transfer	5.1. Defining latent heat, sensible heat and total heat
	5.2. Defining thermal resistance to be included in the pressure drop
	5.3. Defining the main modes of heat transfer in a building
	5.4. Defining the relationship between condensation and water content (absolute humidity), relative humidity, the dew point and condensation point
	5.5. Defining wind and chimney effect pressures on a building and their impact on heat load calculations for ventilation and air treatment systems
6. Describing the main characteristics of hot air distribution systems	6.1. Describing the main components and accessories of hot air distribution systems
	6.2. Describing the operation of a hot air distribution system and ductwork

LEGISLATIVE, NORMATIVE AND REGULATORY FRAMEWORK

ELEMENTS OF COMPETENCE

7. Providing a framework for work relating to ventilation and air treatment systems (HVAC systems) in compliance with applicable laws, standards and regulations in effect

**Legislative, normative and
regulatory framework**

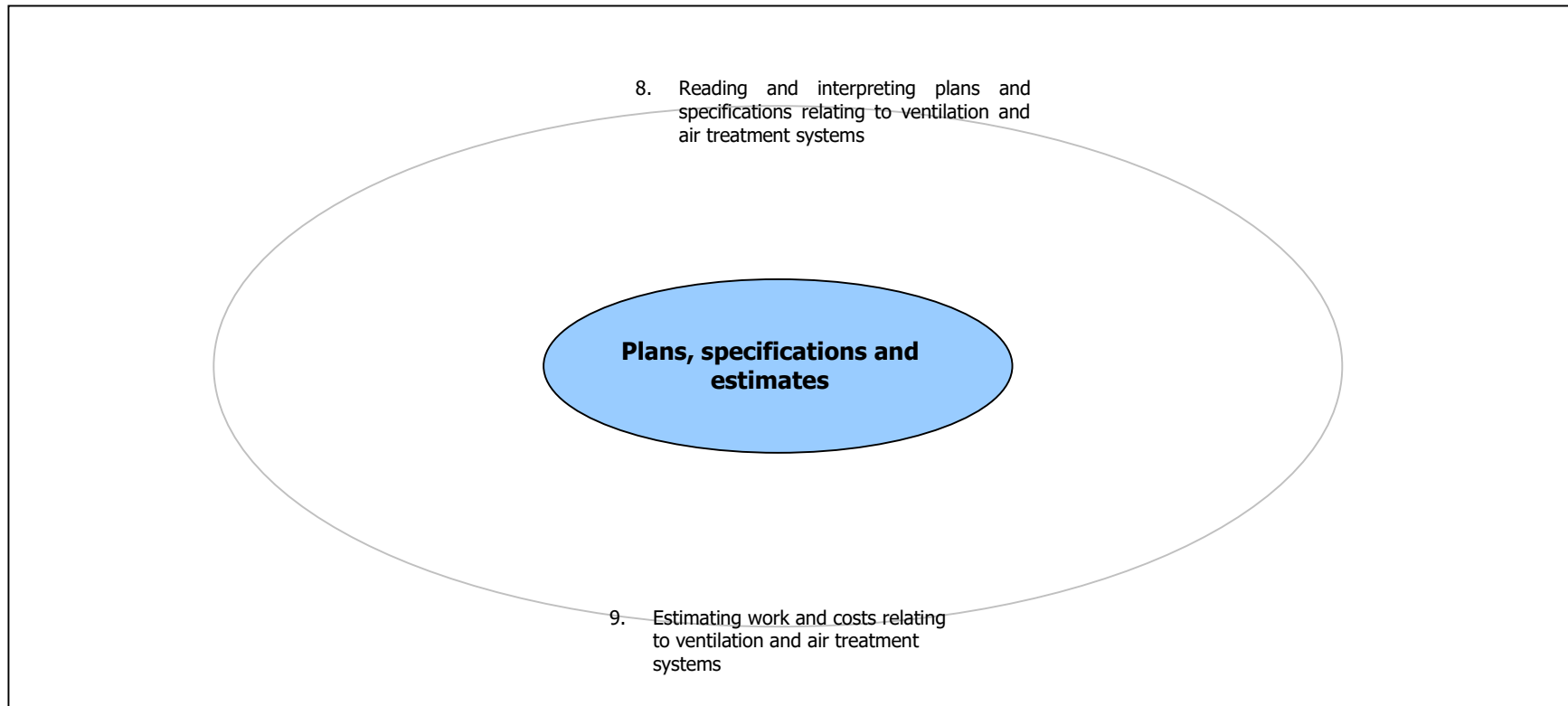
LEGISLATIVE, NORMATIVE AND REGULATORY FRAMEWORK

ELEMENTS OF COMPETENCE	MINIMUM SKILLS REQUIRED
<p>7. Providing a framework for work relating to ventilation and air treatment systems (HVAC systems), in compliance with applicable laws, standards and regulations in effect</p>	<p>7.1. Identifying organizations and their compliance applications by affixing their seals on components of ventilation and air treatment systems and/or their installation</p>
	<p>7.2. Describing the application of <i>Chapter 1, Building</i>, of the <i>Québec Construction Code</i> as it relates to work on ventilation and air treatment systems (parts 9, 10 and 11)</p>
	<p>7.3. Describing the application of <i>Chapter III, Plumbing</i>, of the <i>Québec Construction Code</i> as it relates to work on ventilation and air distribution systems</p>
	<p>7.4. Understanding the relationship between the different codes, regulations and standards that apply specifically to work on ventilation and air treatment systems</p>
	<p>7.5. Understanding the structure of the <i>Québec Construction Code (CQLR c. B -1.1, r.2)</i></p>
	<p>7.6. Explaining the field of application of the <i>CAN/CSA-F326-M – Residential Mechanical Ventilation Systems</i> standard as it relates to work on the installation of ventilation systems in dwellings</p>
	<p>7.7. Explaining prevailing standards applicable to best practices for the installation of ventilation and air treatment systems, including among others the:</p> <ul style="list-style-type: none"> • ASHRAE standards and manuals • HRAI Digest • <i>HVAC Duct Construction Standards (SMACNA)</i>

ELEMENTS OF COMPETENCE	MINIMUM SKILLS REQUIRED
	<p>7.8. Knowledge of the requirements of this class as they relate to the installation of HVAC systems based on the application of the following reference documents, among others:</p> <ul style="list-style-type: none"> • <i>CSA-B149.1 – Natural Gas and Propane Installation Code (amended Québec)</i> • <i>CSA-B139 – Installation Code for Oil-Burning Equipment</i> • <i>CSA-B365 – Installation Code for Solid-Fuel-Burning Appliances and Equipment</i> • <i>CSA-F280 – Determining the Required Capacity of Residential Space Heating and Cooling Appliances</i> • <i>CAN/CSA-C273.5 Installation of Air-Source Heat Pumps and Air Conditioners</i> • ASHRAE standards and manuals <p>7.9. Knowledge of the <i>Regulation respecting the professional qualification of contractors and owner-builders</i>, which deals with work related to air distribution and treatment systems, required licences and intervention limits</p> <p>7.10. Explaining the roles and responsibilities of the team of professionals, general contractors, specialized contractors and suppliers, as they relate to the demonstrated compliance of plans and specifications with applicable codes, standards and regulations in effect</p> <p>7.11. Explaining the application of municipal by-laws (noise level, clearance, location, visibility, etc.)</p> <p>7.12. Naming the main energy efficiency programs available in Québec</p> <p>7.13. Knowledge of the application <i>Chapter I. Part 1, Energy Efficiency of Buildings, Québec Construction Code</i> as it relates to work on air distribution and treatment systems</p> <p>7.14. Knowledge of measures prescribed for the sub-slab depressurization work:</p> <ul style="list-style-type: none"> • <i>Radon – Reduction Guide for Canadians</i> (Health Canada 2014) • <i>CAN/CGSB-149.11-2019: Radon control options for new construction in low-rise residential buildings</i> from the Canadian General Standards Board

PLANS, SPECIFICATIONS AND ESTIMATES

ELEMENTS OF COMPETENCE



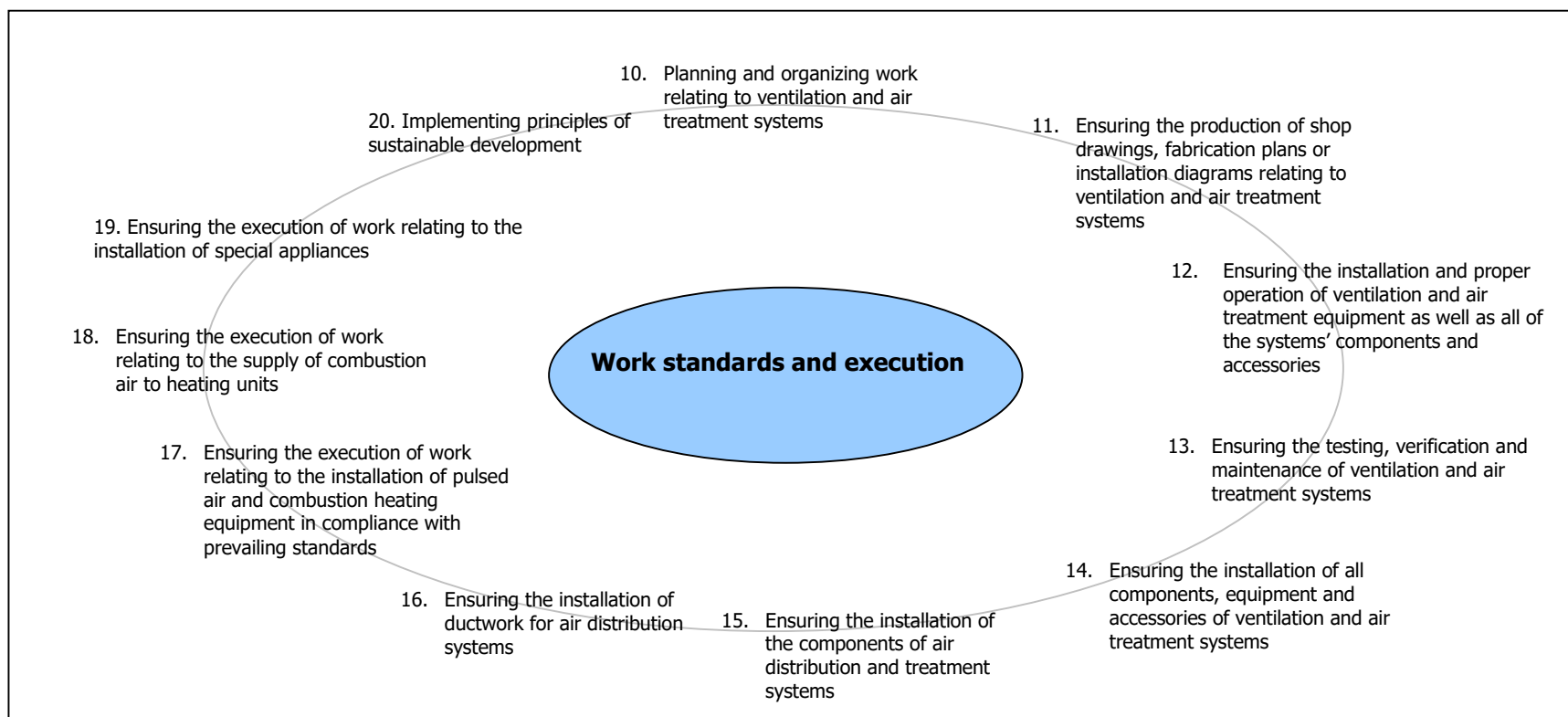
PLANS, SPECIFICATIONS AND ESTIMATES

ELEMENTS OF COMPETENCE	MINIMUM SKILLS REQUIRED
8. Reading and interpreting plans and specifications relating to ventilation and air treatment systems	8.1. Listing the types of plans issued for a project's various stages
	8.2. Locating, on a plan, elements related to the installation of ventilation and air treatment systems
	8.3. Interpreting, on a plan, elements related to the installation of ventilation and air treatment systems
	8.4. Referring to plans and specifications for the work of the different specialties involved in a construction project, to ensure effective coordination between stakeholders and the different specialties
	8.5. Identifying, on a plan, the different elements relating to ventilation and air treatment systems
	8.6. Interpreting information using plans and specifications, dealing with the different responsibilities related to work on ventilation and air treatment systems
	8.7. Understanding the structure of a quote
	8.8. Interpreting information and equipment specifications using plans and specifications
9. Estimating work and costs relating to ventilation and air treatment systems	9.1. Evaluating the capacity of an existing ventilation and air treatment system
	9.2. Diagnosing the capacity of an existing ventilation and air treatment system

ELEMENTS OF COMPETENCE	MINIMUM SKILLS REQUIRED
	9.3. Proposing a solution for correcting the capacity of an existing ventilation and air treatment system
	9.4. Performing the calculations needed to determine the characteristics of equipment that is part of a ventilation and air treatment system
	9.5. Calculating ductwork size based on applications and locations
	9.6. Selecting equipment, accessories and materials in keeping with calculations, needs, applications and prevailing regulations
	9.7. Selecting equipment and materials based on needs and specific uses
	9.8. Determining the quantities and sizes of different types of pipes and ducts required, based on the different types of materials
	9.9. Keeping track of the quantities and sizes of different types of pipes and ducts, based as well on the different types of materials
	9.10. Ensuring that the proposed work on ventilation and air treatment systems complies with applicable codes, standards and regulations in effect

WORK STANDARDS AND EXECUTION

ELEMENTS OF COMPETENCE



WORK STANDARDS AND EXECUTION

ELEMENTS OF COMPETENCE	MINIMUM SKILLS REQUIRED
10. Planning and organizing work relating to ventilation and air treatment systems	10.1. Scheduling activities related to work on ventilation and air treatment systems
	10.2. Ordering and receiving equipment and materials required for work on ventilation and air treatment systems
	10.3. Assuming responsibilities inherent to one's field of expertise as they relate to construction work on the project
	10.4. Ensuring efficient coordination between stakeholders in various fields of expertise
11. Ensuring the production of shop drawings, fabrication plans or installation diagrams relating to ventilation and air treatment systems	11.1. Establishing the quantities, sizes and locations of the various components and accessories of ventilation and air treatment systems
	11.2. Communicating the information required for the production of shop drawings, fabrication plans or installation diagrams and providing them in proper form
	11.3. Transferring all elements of the ventilation and air treatment systems to the architectural and structural plans
	11.4. Producing diagrams for the installation of ventilation and air treatment systems on architectural and structural plans
	11.5. Ensuring that shop drawings, fabrication plans and installation diagrams comply with applicable codes, standards and regulations in effect
	11.6. Having installation diagrams approved by the owner or his authorized representative

ELEMENTS OF COMPETENCE	MINIMUM SKILLS REQUIRED
12. Ensuring the installation and proper operation of ventilation and air treatment equipment as well as all of the systems' components and accessories	12.1. Ensuring the installation and proper operation of air exhaust equipment, taking required precautions, particularly as they relate to clearance from gas stoves
	12.2. Ensuring the installation and proper operation of air compensation equipment to counter depressurization of the building
	12.3. Ensuring the installation and proper installation of all components and accessories of control systems, except for heating controls
	12.4. Ensuring the installation and connection of all components and accessories of ventilation and air treatment systems
	12.5. Ensuring the installation of the system's finishes (grid, diffuser, louvers, etc.)
	12.6. Installing new air supply equipment in compliance with applicable codes, standards and regulations in effect
	12.7. Ensuring the installation of ductwork while preserving the depressurization of the underpinning
13. Ensuring the testing, verification and maintenance of ventilation and air treatment systems	13.1. Explaining testing requirements related to ventilation and air treatment systems
	13.2. Establishing procedures for the start-up of ventilation systems
	13.3. Explaining procedures and requirements for the balancing and leak testing of ventilation and air treatment systems
	13.4. Providing the owner or his authorized representative all documentation relating to the operation and maintenance of ventilation and air treatment systems
	13.5. Explaining the operation and maintenance of the ventilation and air treatment systems to the owner, his authorized representative and/or the end-user
	13.6. Ensuring the maintenance and, if required, the replacement of defective components, equipment and accessories
	13.7. Providing the owner or his authorized representative with a maintenance or repair report
	13.8. Starting up the ventilation and air treatment systems

ELEMENTS OF COMPETENCE	MINIMUM SKILLS REQUIRED
14. Ensuring the installation of all components, equipment and accessories of ventilation and air treatment systems	14.1. Listing risks related to the work as well as the maintenance of ventilation and air treatment systems
	14.2. Explaining precautions required when carrying out installation and/or maintenance work on ventilation and air treatment systems
	14.3. Explaining requirements ensuring that all components and equipment of ventilation and air treatment systems are moved safely
15. Ensuring the installation of the components of air distribution and treatment systems	15.1. Identifying and marking all locations where air ducts, equipment and accessories are to be installed
	15.2. Specifying how to secure properly air ducts, equipment and accessories based on the project's specific condition
	15.3. Ensuring the secure installation of ductwork, taking into account the project's specific conditions (suspension, vibrations, etc.)
	15.4. Sealing duct connection joints to minimize air leakage
	15.5. Ensuring that work related to ventilation and air treatment systems complies with applicable codes, standards and regulations in effect
	15.6. Identifying and marking the location of all concealed accessories and components of ventilation and air treatment systems
	15.7. Ensuring the continuity of grounds on both sides of non-conductive elements of a metal duct system (flexible fittings, etc.) allowing contractors licenced in the appropriate class to provide proper grounding
	15.8. Explaining methods for the installation of all components and accessories based on requirements specific to the latter
	15.9. Ensuring architectural and structural integrity
	15.10. Ensuring the presence and proper location of identification plates
	15.11. Ensuring that bases, supports and anchors are adequate and compliant

ELEMENTS OF COMPETENCE	MINIMUM SKILLS REQUIRED
	<p>15.12. Ensuring that work on ventilation and air treatment systems is properly coordinated with work involving the project's various fields of expertise</p> <p>15.13. Maintaining the firewall of architectural partitions using proper mechanical components installed according to code</p>
16. Ensuring the installation of ductwork for air distribution systems	<p>16.1. Explaining requirements related to the installation and fabrication of air ducts based on the combustibility or non-combustibility of materials</p> <p>16.2. Explaining requirements and methods relating to the insulation of air ducts, vapour barriers, etc.</p> <p>16.3. Explaining requirements related to the protection of air duct materials against damage from corrosion or other factors</p> <p>16.4. Ensuring compliance with part 9 of the <i>Québec Construction Code</i> as it relates to the non-combustibility of multi-unit dwellings</p>
17. Ensuring the execution of work relating to the installation of pulsed air and combustion heating equipment in compliance with prevailing standards	<p>17.1. Physical clearances and accessibility</p> <ul style="list-style-type: none"> • Explaining requirements in terms of accessibility and physical clearances from combustible materials • Explaining requirements related to the installation of pulsed air heating units <p>17.2. Air supply:</p> <ul style="list-style-type: none"> • Specifying requirements <p>17.3. Air supply:</p> <ul style="list-style-type: none"> • Ensuring that installation work is carried out in compliance with applicable standards in effect for this category, including: <ul style="list-style-type: none"> ○ <i>CSA-B149.1 – Natural Gas and Propane Installation Code (Québec amendment)</i> ○ <i>Québec Construction Code, Chapter II, Gas</i> ○ <i>CSA-B139 – Installation Code for Oil-Burning Equipment</i> ○ <i>CSA-B365 – Installation Code for Solid-Fuel-Burning Appliances and Equipment</i>

ELEMENTS OF COMPETENCE	MINIMUM SKILLS REQUIRED
18. Ensuring the execution of work relating to the supply of combustion air to heating units	18.1. Establishing, for this class, the sizes and locations of air supply openings supplying dilution, combustion and ventilation air to combustion equipment
	18.2. Establishing, for this class, the location of air supply openings based on fuel type
	18.3. Establishing, for this class, the characteristics of a mechanical air supply system
	18.4. Specifying requirements relating to air supply work
	18.5. Ensuring the execution of air supply work based on applicable standards in effect for this category, including among others: <ul style="list-style-type: none"> • <i>CSA-B149.1 – Natural Gas and Propane Installation Code (amended, Québec)</i> • <i>Québec Construction Code, Chapter II, Gas</i> • <i>CSA-B139 – Installation Code for Oil-Burning Equipment</i> • <i>CSA-B365 – Installation Code for Solid-Fuel-Burning Appliances and Equipment</i>
19. Ensuring the execution of work relating to the installation of special appliances	19.1. Ensuring the proper installation of equipment
20. Implementing principles of sustainable development	20.1. Explaining best practices as they relate to sustainable development in residential ventilation
	20.2. Knowledge of regulations incorporating new energy efficiency requirements for small residential buildings
	20.3. Knowledge of residential ventilation systems allowing a reduction in greenhouse gases