Revoked on June 27, 2020
This document has official status.

chapter E-1.1, r. 1

Regulation respecting energy conservation in new buildings

Act respecting the conservation of energy in buildings
(chapter E-1.1, s. 16).

Revoked, O.C. 486-2020, 2020 G.O. 2, 1425; eff. 2020-06-27.

Note *Despite the foregoing, the provisions of this Regulation may apply to construction work referred to in sections 1.1.2 and 1.1.3 of the Construction Code (chapter B-1.1, r. 2), as enacted by section 1 of O.C. 486-2020, 2020 G.O. 2, 1425, provided that the work begins before 27 December 2021.*

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CHAPTER 1

GENERAL PROVISIONS

DIVISION 1

DEFINITIONS AND INTERPRETATION

1. *In this Regulation, unless the context requires otherwise,*

"business and personal services occupancy" means the occupancy or use of a building or part thereof for the transaction of business or the rendering or receiving of professional or personal services;

"dual-duct systems" means a mechanical ventilation system in which the air supplied by separate hot and cold air ducts is mixed at terminals to meet thermostatic demand;

"dwelling unit" means a room or suite of rooms used or intended for use as a domicile by one or more persons for cooking, living, sleeping purposes and usually containing sanitary facilities;

"floor area" means the space on any story of a building between the interior face of the exterior walls and the required firewalls, including the space occupied by interior walls and partitions, but not including exits and vertical service spaces that pierce the storey;

"hospital, aid or detention centre" means a building or part thereof occupied by persons who require special care or treatment because of age, mental or physical limitations or who are involuntarily detained for penal or correctional purposes, or whose liberty is restricted;

"major occupancy" means the principal occupancy, of a building or part thereof. Major occupancy is considered as including any subsidiary occupancy which is an integral part of the principal occupancy;

"mercantile occupancy" means the occupancy or use of a building or part thereof for the display or sale of retail goods, wares or merchandise;

"reheat" means the application of sensible heat to supply air that has been previously cooled below the temperature of the conditioned space by mechanical refrigeration or the introduction of outside air to provide cooling;

"residential occupancy" means a building or part thereof used as a living place by persons for whom sleeping accommodation is provided, with the exception of a hospital, aid or detention centre;

"shading coefficient" means the ratio between the total solar heat gain through the glazing and the total solar heat gain through an ordinary clear plate glass 4 mm thick, subject to the very same conditions;

"thermal resistance" means the inverse of the quantity of thermal energy passing through a unit area of a material, from one face to the other, within a unit time, when the temperature difference between the two surfaces is equal to one degree.

O.C. 89-83, s. 1; O.C. 1721-85, s. 1.

2. *The abbrevations used in this Regulation mean the following:*

CGA: Canadian Gas Association;

ARI: Air Conditioning & Refrigeration Institute;

ASHRAE: American Society of Heating, Refrigerating and Air-Conditioning Engineers;

ASTM: American Society for Testing and Materials;

CAN: Standards Council of Canada;

CSA: Canadian Standards Association (ACNOR);

HI: Hydronics Institute;

CGSB: Canadian General Standards Board;

SMACNA: Sheet Metal and Air Conditioning Contractors National Association Inc.

O.C. 89-83, s. 2.

DIVISION 2

SCOPE

3. *The Act respecting the conservation of energy in building (chapter E-1.1) and this Regulation apply to the design and construction of buildings, except for:*

(*1*) *building or parts thereof whose design energy load, other than manufacturing and processing operations, is less than 10 W/m^2 of floor area;*

(*2*) *horticultural, silvicultural and botanical greenhouses, and greenhouses used for research;*

(*3*) *public buildings or parts thereof which are not intended to be heated during winter.*

O.C. 89-83, s. 3; O.C. 1721-85, s. 2.

DIVISION 3

PLANS AND SPECIFICATIONS

4. *Plans and specifications shall include the relevant data and features of the building, including those of the technical installations and the calculations necessary to determine its compliance with the requirements of this Regulation.*

O.C. 89-83, s. 4.

DIVISION 4

OUTDOOR DESIGN TEMPERATURE

5. *The outdoor design temperature for heating purposes, mentioned in sections 55, 78, 137 and 138 of a building situated in a municipality listed in Schedule 1, is the temperature shown for that municipality.*

However, for a building situated elsewhere than in a municipality listed in Schedule 1, the outdoor design temperature is the one for the nearest municipality mentioned; or in the case of a building located in a municipality that is equidistant from 2 listed municipalities the outdoor design temperature is that of the municipality with the lowest temperature.

O.C. 89-83, s. 5.

CHAPTER 2

THERMAL INSULATION, VAPOR BARRIER AND MEASURES TO PREVENT CONDENSATION

DIVISION 1

SCOPE

(Replaced)

O.C. 89-83, c. 2, Div. 1; O.C. 1721-85, s. 3.

6. *This Chapter applies to all buildings, except sections 8, 12 and 13 which apply only to residential occupancies no more than 3 stories high and whose building area does not exceed 600 m^2.*

O.C. 89-83, s. 6; O.C. 1721-85, s. 3.

DIVISION 2

(Replaced)

O.C. 89-83, c. 2, Div. 2; O.C. 1721-85, s. 3.

7. *The thermal resistance of an insulating material of a building assembly shall be determined in accordance with ASTM C518-85, Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus or with ASTM C177-85, Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded Hot Plate Apparatus. Tests on non-homogenous panels shall comply with ASTM C236-87, Standard Test Method for Steady-State Thermal Performance of Building Assemblies by Means of a Guarded Hot Box. Tests musts be carried out at an average temperature of 24 ºC (±3 ºC) and under a temperature difference of 22 ºC (±2 ºC). Materials must also be tested after conditioning procedure in accordance with CGSB, CSA or ASTM quality standards, depending on the materials.*

O.C. 89-83, s. 7; O.C. 1721-85, s. 3; O.C. 1211-92, s. 1.

8. *Vapour barriers, their installation, the installation of insulation materials and measures for preventing condensation shall comply with Articles 9.25.3.3, 9.25.3.5, 9.25.4.1(2) to 9.25.4.3, 9.25.4.8, 9.25.5.1 to 9.25.5.8, 9.25.6.1 and 9.25.6.2 of the National Building Code 1990.*

O.C. 89-83, s. 8; O.C. 1721-85, s. 3; O.C. 1211-92, s. 2.

9. *Insulation applied to the exterior of a basement foundation wall or to the exterior of a slab-on-ground floor must extend down to at least 600 mm below exterior ground level.*

However, in the case of a slab-on-ground floor without a foundation wall, the insulation may extend down and outward from the floor over a total distance of at least 600 mm measured from the finished ground level.

O.C. 89-83, s. 9; O.C. 1721-85, s. 3.

DIVISION 3

(Replaced)

O.C. 89-83, c. 2, Div. 3; O.C. 1721-85, s. 3.

10. *Insulation applied to the interior of a foundation wall must extend from the underside of the flooring above this wall down to a minimum of 600 mm below the exterior adjacent ground level. However, hollow*

masonry foundation walls must be insulated along their full height, or their cells must be sealed at the level of the bottom part of the insulation.

O.C. 89-83, s. 10; O.C. 1721-85, s. 3.

11. *Where insulation on the interior of a foundation wall on the perimeter of a crawl space may be damaged by water, it must be installed at a minimum of 50 mm above the floor of the crawl space.*

O.C. 89-83, s. 11; O.C. 1721-85, s. 3.

12. *Lightweight plastic-type insulation installed on a masonry or concrete wall may be without a vapor barrier if:*

(*1*) *its permeance rating is not more than 250 ng/(Pa•s•m^2); and*

(*2*) *the vapor barrier function is permanently ensured at all joints and on the perimeter.*

O.C. 89-83, s. 12; O.C. 1721-85, s. 3.

13. *For all insulated ceilings and for exterior walls where the outside or intermediary sheathing has a water vapor permeance coefficient lower than 250 ng/(Pa•s•m^2), the following requirements must also be met:*

(*1*) *insulation must be protected by a Type 1 vapor barrier and installed so that all joints occur at framing members, furring or blocking, and lapped at least 100 mm at all joints; and*

(*2*) *holes through vapour barriers installed in ceilings for the installation of electrical wiring, electrical boxes, piping or duct work must be effectively sealed with tape or any other sealing material.*

O.C. 89-83, s. 13; O.C. 1721-85, s. 3.

14. *Attics or roof spaces above in insulated ceiling must be ventilated with openings to the exterior to provide an unobstructed vent area of not less than 1/300 of the insulated ceiling area.*

Vents may be roof type, eaves type, gable-end type or any combination thereof, and must be distributed on opposite sides of the building and on the upper and lower parts of the roof, where applicable.

the unobstructed vent area must be determined in accordance with CSA A93-M1982, Vents for Buildings.

O.C. 89-83, s. 14; O.C. 1721-85, s. 3.

15. *Section 14 does not apply to mobile homes wider than 4.3 m, provided that the roof space is sealed by a continuous vapor barrier.*

O.C. 89-83, s. 15; O.C. 1721-85, s. 3.

16. *Notwithstanding section 14, where the roof slope is less than 1 in 6, or where the interior finish is applied directly to the underside of the roof framing members, an attic or roof space above an insulated ceiling must have open-air vent openings with an unobstructed vent area no less than 1/150 of the surface of the insulated ceiling area.*

Vents may be roof type, gable-end type or any combination thereof, and must be distributed on opposite sides of the building or, where applicable, on the upper and lower parts of the roof.

Where the roof slope is less than 1 in 6, or where the roof slope is at least 1 in 6 but the interior finish is applied directly to the underside of the roof framing members, cross purlins at least 38 mm deep must be placed over and across the roof framing members and a clearance of at least 25 mm must be left between the underside of these cross purlins and the top of the insulating material.

Where the roof slope is at least 1 in 6, and where roof frame members run across the roof slope and when the interior finish is applied directly to the underside of the roof framing members, the cross purlins may be omitted if a clearance of at least 75 mm is left between the underside of the roof sheathing framing and the upper side of the insulation if the clearance continues along the total length of roof framing members and if open-air vent openings are installed at both extremities of each clearance.

O.C. 89-83, s. 16; O.C. 1721-85, s. 3.

DIVISION 4

(Replaced)

O.C. 89-83, c. 2, Div. 4; O.C. 1721-85, s. 3.

17. *The upper part of a mansard style roof must be vented in accordance with the requirements of sections 14 to 16; however, at least 50% of the area of the required vent openings must be provided near the junction of the lower and upper portions.*

O.C. 89-83, s. 17; O.C. 1721-85, s. 3.

18. *(Replaced).*

O.C. 89-83, s. 18; O.C. 1721-85, s. 3.

19. *(Replaced).*

O.C. 89-83, s. 19; O.C. 1721-85, s. 3.

20. *(Replaced).*

O.C. 89-83, s. 20; O.C. 1721-85, s. 3.

21. *(Replaced).*

O.C. 89-83, s. 21; O.C. 1721-85, s. 3.

22. *(Replaced).*

O.C. 89-83, s. 22; O.C. 1721-85, s. 3.

23. *(Replaced).*

O.C. 89-83, s. 23; O.C. 1721-85, s. 3.

24. *(Replaced).*

O.C. 89-83, s. 24; O.C. 1721-85, s. 3.

25. *(Replaced).*

O.C. 89-83, s. 25; O.C. 1721-85, s. 3.

26. *(Replaced).*

O.C. 89-83, s. 26; O.C. 1721-85, s. 3.

27. *(Replaced).*

O.C. 89-83, s. 27; O.C. 1721-85, s. 3.

28. *(Replaced).*

O.C. 89-83, s. 28; Erratum, 1985 G.O. 2, 3709; O.C. 1721-85, s. 3.

29. *(Replaced).*

O.C. 89-83, s. 29; O.C. 1721-85, s. 3.

30. *(Replaced).*

O.C. 89-83, s. 30; Erratum, 1985 G.O. 2, 3709; O.C. 1721-85, s. 3.

31. *(Replaced).*

O.C. 89-83, s. 31; Erratum, 1985 G.O. 2, 3709; O.C. 1721-85, s. 3.

32. *(Replaced).*

O.C. 89-83, s. 32; O.C. 1721-85, s. 3.

CHAPTER 3

SINGLE-FAMILY HOUSES

DIVISION 1

SCOPE

33. *A single-family house shall be designed and built in conformity with the requirements of Chapters 1 and 2 and,*

(*1*) *in conformity with the requirements of this Chapter; or*

(*2*) *in conformity with the provisions of Chapter 4 or 5, if applicable, and of Chapter 7.*

A single-family house may be detached, semi-detached or row-type.

O.C. 89-83, s. 33.

DIVISION 2

THERMAL RESISTANCE OF BUILDING COMPONENTS

34. *Except for doors, windows, skylights and other closures, the thermal resistance of each building component, not taking into account framing or furring, situated in a municipality in one of the zones mentioned in Schedule 2, shall comply with the values prescribed in the table below for that zone.*

A building situated elsewhere than in a municipality listed in Schedule 2 is included in the same zone as the nearest municipality mentioned. If there is more than one municipality situated equidistant from the municipality where the building is located, it is included in the zone of the municipality with the most stringent requirements.

TABLE

(s. 34)

Minimum thermal resistance (R_t), m^2 • °C/W

Building components	Zones A	B	C	D	E	F
Roofs or ceilings separating a heated space from an unheated space or the outside air	5.3	5.6	6.0	6.3	6.8	7.1
Walls above ground level (other than foundation walls) separating a heated space from an unheated space or the outside air	3.4	3.6	3.8	4.0	4.2	4.5
Foundation walls separating a heated space from an unheated space, the outside air or the adjacent ground	2.2	2.2	2.2	2.2	2.2	2.2
Floors separating a heated space from an unheated space or the outside air	4.7	4.7	4.7	4.7	4.7	4.7

O.C. 89-83, s. 34.

35. *The thermal resistance required in section 34 for insulated roofs or ceilings separating heated space from unheated space or the outside air may be reduced near the eaves where required by the roof slope and the ventilation clearances. However, the thermal resistance directly above the inner surface of the outside wall shall be at least 2.1 m^2 • °C/W.*

O.C. 89-83, s. 35.

36. *Every foundation wall face having more than 50% of its area exposed to outside air and those parts of foundation walls of wood-frame construction shall have a minimum thermal resistance equal to the requirements in the table in section 34 for walls above ground level.*

O.C. 89-83, s. 36.

DIVISION 3

GLAZING

37. *Subject to section 38, any glazed area separating heated space from unheated space or the outside air shall have a minimum thermal resistance of 0.35 m^2 • °C/W.*

O.C. 89-83, s. 37.

38. *All windows and skylights separating heated space from unheated space or the outside air in a building constructed in Zones E and F mentioned in Schedule 2 shall have a minimum thermal resistance of 0.50 m^2 • °C/W.*

O.C. 89-83, s. 38.

39. *The total area of glazing, including glazing for doors and skylights separating a heated space from an unheated space or the outside air shall not exceed 15% of the floor area.*

However, a natural person wishing to have a building constructed for his exclusive use as a residence may require specifications for such building different from those prescribed in this section.

O.C. 89-83, s. 39.

DIVISION 4

DOORS AND WINDOWS

40. *A door separating a heated space from the outside air shall be protected by a storm door, unless, except for its glazed part, it has an average thermal resistance of at least 0.7 m^2 • °C/W: for unless it opens onto an enclosed unheated vestibule.*

O.C. 89-83, s. 40.

41. *Windows shall comply with the requirements of CAN/CSA-A440-M90, "Windows" and sealed glass units shall comply with CAN/CGSB-12.8-M90, "Insulating Glass Units".*

O.C. 89-83, s. 41; O.C. 1211-92, s. 3.

DIVISION 5

AIR TIGHTNESS

42. *Sliding glass doors and windows that separate heated space from unheated space or the outside air shall be designed to limit air leakage in conformity with the requirements of sections 67 and 68.*

O.C. 89-83, s. 42.

43. *A swing type door and a garage door separating a heated space from an unheated space or the outside air must be weather-stripped on all edges.*

O.C. 89-83, s. 43; O.C. 1721-85, s. 4.

44. *In order to insure air tightness in heated spaces of a building, caulking shall be done in the following locations:*

(*1*) *junction between the sill plate and the foundation;*

(*2*) *openings for utility service entrances;*

(3) *and any other location where there is a possibility of air leakage.*

O.C. 89-83, s. 44.

45. *Sealing compound shall comply with the requirements of Article 9.27.4.2(2) of the National Building Code 1990.*

O.C. 89-83, s. 45; O.C. 1721-85, s. 5; O.C. 1211-92, s. 4.

DIVISION 6

MECHANICAL VENTILATION

O.C. 89-83, c. 3, Div. 6; O.C. 1211-92, s. 5.

46. *A single-family house shall be equipped with a mechanical ventilation system.*

O.C. 89-83, s. 46; O.C. 1211-92, s. 5.

46.1. *A mechanical ventilation system shall comply with the requirements of Subsection 9.32.3 of the National Building Code 1990.*

O.C. 1211-92, s. 5.

46.2. *The external air intake opening of a mechanical ventilation system shall be equipped with a control apparatus that limits the quantity of air admitted to the quantity required by the ventilation system.*

O.C. 1211-92, s. 5.

46.3. *The ventilator of a kitchen stove hood shall not be considered in calculating the capacity of the system mentioned in Article 9.32.3.3(3) of the National Building Code 1990.*

O.C. 1211-92, s. 5.

DIVISION 7

WATER HEATER

47. *The thermal efficiency of electric, gas-fired or oil-fired water heaters shall comply with Division 2 of Chapter 7.*

O.C. 89-83, s. 47.

CHAPTER 4

ENCLOSURES FOR BUILDINGS WITH LOW ENERGY REQUIREMENTS FOR LIGHTING, FANS AND PUMPS

DIVISION 1

SCOPE

48. *This Chapter applies to all buildings except those built in conformity with paragraph 1 of section 33 and those for which the owner avails himself of the provisions of Chapter 5 in conformity with section 49.*

O.C. 89-83, s. 48.

49. *Where the owner can demonstrate that the total load of all wired-in interior lighting, plus the total power of all fans and water pumps, excluding standby equipment, exceeds an average of 25 W/m^2 of floor area in those parts of the building that are heated or cooled, the requirements of Chapter 5 may be used instead of the requirements of this Chapter.*

O.C. 89-83, s. 49.

50. *For the purpose of section 49, in the case of a multiple-occupancy building, a separate calculation shall be made for the part of the building intended for dwelling occupancy in order to determine if the choice mentioned in section 49 is possible for that part of the building.*

O.C. 89-83, s. 50.

DIVISION 2

THERMAL RESISTANCE OF BUILDING COMPONENTS

51. *Except for doors, windows, skylights and other closures, the thermal resistance of each building component, not taking into account framing or furring, situated in a municipality in one of the zones mentioned in Schedule 2, shall comply with the values prescribed in the table below for that zone.*

A building situated elsewhere than in a municipality listed in Schedule 2 is included in the same zone as the nearest municipality mentioned. If there is more than one municipality situated equidistant from the municipality where the building is located, it is included in the zone of the municipality with the most stringent requirements.

This section does not apply to those parts of building enclosures made with materials designed to collect and store solar energy, on the condition that their use does not increase the building energy requirements during winter compared with building components built in conformity with the requirements of this section.

TABLE

(s. 51).

Minimum thermal resistance (R_t), $m^2 \cdot °C/W$

Building Assembly	Zones					
	A	B	C	D	E	F
Wall assemblies above ground level (other than foundation walls) separating heated space from unheated space or the outside air:						
(1) for a wall of any type other than that specified in (2):	3.4	3.6	3.8	4.0	4.2	4.5
(2) for a concrete or masonry wall insulated with rigid material on the outside only:	2.9	3.1	3.3	3.5	3.7	3.9
Foundation wall assemblies separating heated space from unheated space, outside air or adjacent earth:	2.2	2.2	2.2	2.2	2.2	2.2
Roof, ceiling or floor assemblies separating heated space from unheated space or the exterior:						
(1) for any assembly other than those specified in (2):						
— roof or ceiling	5.3	5.6	6.0	6.3	6.8	7.1
— floor:	4.7	4.7	4.7	4.7	4.7	4.7
(2) for a floor, roof or ceiling assembly of massive wood panelling at least 38 mm thick, or of steel or concrete slabs, and insulated with rigid material only	2.9	3.1	3.3	3.5	3.7	3.9
Perimeter of slab-on-ground floors less than 600 mm below adjacent ground level:						
(1) where heating ducts, pipes or resistance wiring are embedded in or beneath the slabs:	1.6	1.7	1.9	2.0	2.3	2.5
(2) slab-on-ground floors other than those described in (1):	1.2	1.3	1.5	1.7	1.9	2.1

O.C. 89-83, s. 51; O.C. 1721-85, s. 6.

52. *The thermal resistance of the insulated portion of a building assembly incorporating metal posts, studs or joints that act as thermal bridges must be 20% greater than the values shown in the Table in section 51, unless the heat flow is not greater than the heat flow through a wood frame assembly of the same thickness.*

O.C. 89-83, s. 52; O.C. 1721-85, s. 7.

53. *Section 52 does not apply where constituting elements of thermal bridge are insulated by a material providing a thermal resistance at least equal to 25% of the thermal resistance required in the table in section 51.*

O.C. 89-83, s. 53.

54. *The thermal resistance of a building assembly may be reduced by not more than 20% form that required in sections 51 and 52, on the condition that the thermal resistance of other assemblies of the building are increased, so that the total calculated heat loss from the building enclosure does not exceed the heat loss that would result if the enclosure were in conformity with sections 51 and 52.*

For the purpose of this section, the calculated heat loss must not take into account the solar heat gain.

O.C. 89-83, s. 54.

55. *Notwithstanding section 51 and subject to the Regulation respecting the quality of the work environment (chapter S-2.1, r. 11), where the indoor winter design temperature is less than 18 ºC, the minimum thermal resistance R_1 may be determined in accordance with the following formula:*

$$R_1 = \frac{t_i - t_o}{18 - t_o} \cdot R_t$$

where

t_i = *winter indoor design temperature (°C)*

t_o = *outdoor design temperature for heating purposes (°C)*

R_t = *thermal resistance required in section 51 or 52 (m^2 • °C/W)*

This section does not apply to residential occupancy buildings or to hospitals or aid centres.

O.C. 89-83, s. 55; O.C. 1721-85, s. 8.

56. *The thermal resistance prescribed in section 51 and 52 for roofs and ceilings separating a heated space from an unheated space or the outside air may be reduced near the eaves to the extent made necessary by the roof slope and required ventilation clearances. However, the thermal resistance directly above the inner surface of the exterior wall shall be at least 2.1 m^2 • °C/W.*

O.C. 89-83, s. 56.

57. *Every foundation wall face having more than 50% of its area exposed to outside air and those parts of a foundation wall of wood-frame construction shall have a minimum thermal resistance equal to the requirements in the table of section 51 for walls above ground level.*

O.C. 89-83, s. 57.

DIVISION 3

GLAZING

58. *Subject to section 59, all glazing that separates heated space from unheated space or the outside air shall have a minimum thermal resistance of 0.35 m^2 • °C/W.*

This section does not apply to a glass swing-type door with or without a sash that opens onto an enclosed vestibule or stairway.

O.C. 89-83, s. 58; O.C. 1211-92, s. 6.

59. *All windows and skylights that separate heated space from unheated space or the outside air in a building constructed in Aires E and F mentioned in Schedule 2, shall have a minimum thermal resistance of 0.50 m^2 • °C/W.*

O.C. 89-83, s. 59.

60. *For the purpose of this Regulation, the enclosure of any unheated enclosed space separated from a heated space by glazing, such as a sun porch, veranda or vestibule may be considered to offer a thermal resistance of 0.16 m^2 • °C/W.*

O.C. 89-83, s. 60.

61. *The total area of glazing, including glass for doors and skylights, that separates heated space from unheated space or the exterior must meet one of the following requirements:*

(*1*) *in the case of a residential occupancy building of 2 storeys or less or of a building comprising 8 dwelling units or less, it must not exceed 15% of the floor area;*

(*2*) *in the case of any other building, it must not exceed either 15% of the floor area or 40% of the total area of the walls separating the heated space of a storey from the unheated space or outside air, and of the party walls.*

For the purposes of this section, these percentages may be considered as a whole for all storeys of a building from the ground up.

For the purposes of this section, the area of a sloping wall corresponds to the projection of the wall on to a vertical plane.

The height used for the calculation of the total area of the walls is measured from the finished floor of the storey to the finished floor of the storey above it.

However, a natural person wishing to have a building constructed for his exclusive use as a residence may require different specifications from those prescribed in this section for the building.

This section does not apply to dispensing booths governed by the Petroleum Products Regulation, to supervision booths or to tollbooths.

O.C. 89-83, s. 61; O.C. 1721-85, s. 9; O.C. 753-91, s. 532.

62. *For the purpose of section 61, where the thermal resistance of the glazing is higher than that required in sections 58 and 59, the area of this glazing, used for calculations, corresponds to the actual area multiplied by the ratio of the required thermal resistance over the actual thermal resistance of the glazing.*

O.C. 89-83, s. 62.

63. *For the purpose of section 61, the non-shaded area in winter of the glazing of a building with an open living space or of a building equipped with a central forced-air heating or ventilating system allowing for the distribution of the solar heat gain from such area, may be considered as 50% of the actual glazing area. Moreover, if the building is equipped with a cooling system, the glazing area used for calculation is considered as 50% of the actual glazing area unshaded in winter but shaded in summer.*

For the purpose of this section, the glazing considered must be clear or have a shading coefficient higher than 0.70 and face a direction within 45 ° of due South.

For the purpose of determining the non-shaded glazing area in winter, the shading must be calculated using the noon sun incident angle of 21 December.

Also, to determine the shaded glazing area in summer, the shading must be calculated using the noon sun incident angle of 21 June.

Moreover, the following may be considered as excluded from the calculation of the total glazing area:

(*1*) *the glazed area of a building that is unshaded in winter and placed in front of any wall or floor made of materials designed to collect and store solar energy; and*

(*2*) *the area of a window equipped with a thermal insulating device allowing an increase in its thermal resistance of at least 0.8 m^2 • °C/W in the absence of sunshine.*

O.C. 89-83, s. 63; O.C. 1721-85, s. 10.

DIVISION 4

DOORS AND WINDOWS

64. *A door separating a heated space from an unheated space or from the outside air shall be protected by a storm door, unless the door, excluding its glazed part, has an average thermal resistance of at least 0.7 m^2 • °C/W or unless it opens onto an unheated enclosed vestibule or stairway.*

This section does not apply to a glass swing-type door with or without a sash.

O.C. 89-83, s. 64; O.C. 1211-92, s. 7.

65. *Air curtains shall not be used in place of exterior doors.*

O.C. 89-83, s. 65.

66. *Windows for residential occupancy buildings shall comply with CAN/CSA-A440-M90, Windows, and sealed glass units shall comply with CAN/CGSB-12.8-M90, Insulating Glass Units.*

O.C. 89-83, s. 66; O.C. 1211-92, s. 8.

DIVISION 5

AIR TIGHTNESS

67. *Windows separating heated space from unheated space or the outside air shall be designed to limit air infiltration to a maximum of 0.77 L/s per metre of sash crack when tested at a pressure differential of 75 Pa in conformity with ASTM E283-84 Standard Test Method for Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors.*

O.C. 89-83, s. 67; O.C. 1211-92, s. 9.

68. *Manually operated exterior sliding glass door assemblies that separate heated space from unheated space or the outside air shall be designed to limit air infiltration to a maximum of 2.5 L/s for each square metre of door area when tested in conformity with section 67.*

O.C. 89-83, s. 68.

69. *Except where the door is weather-stripped on all edges and protected with a storm door or by an enclosed unheated space, exterior swing type door assemblies for dwelling units, individually rented inn, hotel and motel rooms and suites shall be designed to limit air infiltration to not more than 2.5 L/s per square metre of door area when tested in conformity with section 67.*

O.C. 89-83, s. 69.

70. *Door assemblies other than those described in sections 68 and 69 that separate heated space from unheated space or the outside air shall either:*

(*1*) *be designed to limit air infiltration to a maximum of 17 L/s per metre of door crack when tested in conformity with section 67; or*

(*2*) *be weather-stripped on all edges.*

O.C. 89-83, s. 70.

71. *Sealing compound shall comply with the requirements of one of the standards referred to in Article 9.27.4.2(2) of the National Building Code 1990.*

O.C. 89-83, s. 71; O.C. 1721-85, s. 11; O.C. 1211-92, s. 10.

72. *In order to ensure air tightness in heated spaces of a building, caulking shall be done in the following locations:*

(*1*) *junction between the sill plate and the foundation;*

(*2*) *openings for utility service entrances;*

(*3*) *and any other location where there is a possibility of air leakage.*

O.C. 89-83, s. 72.

DIVISION 6

MECHANICAL VENTILATION

O.C. 1211-92, s. 11.

72.1. *A dwelling unit shall be equipped with a mechanical ventilation system.*

O.C. 1211-92, s. 11.

72.2. *A mechanical ventilation system serving a single dwelling unit shall comply with the requirements of Subsection 9.32.3 of the National Building Code 1990.*

O.C. 1211-92, s. 11.

72.3. *A mechanical ventilation system serving several dwelling units shall comply with the requirements of Part 6 of the National Building Code 1990.*

O.C. 1211-92, s. 11.

72.4. *The external air intake opening of a mechanical ventilation system shall be equipped with a control apparatus that limits the quantity of air admitted to the quantity required by the ventilation system.*

O.C. 1211-92, s. 11.

72.5. *The ventilator of a kitchen stove hood shall not be considered in calculating the capacity of the system mentioned in Article 9.32.3.3(3) of the National Building Code 1990.*

O.C. 1211-92, s. 11.

CHAPTER 5

ENCLOSURES FOR BUILDINGS WITH HIGH ENERGY REQUIREMENTS FOR LIGHTING, FANS AND PUMPS

DIVISION 1

SCOPE

73. *The requirements of this Chapter apply to all buildings mentioned in section 49 for which the owner avails himself of the provisions of this Chapter.*

O.C. 89-83, s. 73.

DIVISION 2

THERMAL RESISTANCE OF BUILDING COMPONENTS

74. *Except for doors, windows, skylights and other closures, the thermal resistance of each building component, not taking into account framing or furring, situated in a municipality in one of the zones mentioned in Schedule 2 shall comply with the values prescribed in the table below for that zone.*

A building situated elsewhere than in a municipality listed in Schedule 2 is included in the same zone as the nearest municipality mentioned. If there is more than one municipality situated equidistant from the municipality where the building is located, it is included in the zone of the municipality with the most stringent requirements.

This section does not apply to those parts of building enclosures made with materials designed to collect and store solar energy, on the condition that their use does not increase the building energy requirements during winter compared with building components built in conformity with the requirements of this section.

Table

(s. 74)

Minimum thermal Assembly (R_t), m^2 • °C/W

Building assembly	Zones					
	A	B	C	D	E	F
Wall assemblies above ground level (other than foundation walls) separating heated space from unheated space or the outside air:						
(1) for a wall of any type other than that specified in (2):	2.8	3.0	3.2	3.5	3.8	4.1
(2) for a concrete or masonry wall insulated with rigid material on the outside only:	2.4	2.6	2.8	3.0	3.2	3.5
Foundation wall assemblies separating heated space from unheated space, outside air or adjacent earth:	2.2	2.2	2.2	2.2	2.2	2.2
Roof, ceiling or floor assemblies separating heated space from unheated space or the exterior:						
(1) for any assembly other than those specified in (2):						
— roof or ceiling:	4.4	4.8	5.1	5.5	6.0	6.4
— floor:	4.4	4.7	4.7	4.7	4.7	4.7
(2) for a floor, roof or ceiling assembly of massive wood panelling at least 38 mm thick, or of steel or concrete slabs, and insulated with rigid material only:	2.4	2.6	2.8	3.0	3.2	3.5
Perimeter of slab-on-ground floors less than 600 mm below adjacent ground level:						
(1) where heating ducts, pipes or resistance wiring are embedded in or beneath the slabs:	1.2	1.3	1.5	1.7	1.9	2.1
(2) slab-on-ground floors other than those described in (1):	0.8	0.8	1.0	1.3	1.5	1.7

O.C. 89-83, s. 74; O.C. 1721-85, s. 12.

75. *The thermal resistance of the insulated portion of a building assembly incorporating metal posts, studs or joists that act as thermal bridges must be 20% greater than the values shown in the Table in section 74, unless it can be shown that heat flow is not greater than the heat flow through a wood frame assembly of the same thickness.*

O.C. 89-83, s. 75; O.C. 1721-85, s. 13.

76. *Section 75 does not apply where constituting elements of a thermal bridge are insulated by a material providing a thermal resistance at least equal to 25% of the thermal resistance required in the table in section 74 for the insulated part of a building.*

O.C. 89-83, s. 76; Erratum, 1985 G.O. 2, 3709.

77. *The thermal resistance of a building assembly may be reduced by not more than 20% from that required in sections 74 and 75, on the conditions that the total thermal resistance of other building component of the same enclosure are increased, so that the calculated heat loss from the building enclosure does not exceed the heat loss that would result if all building components of the enclosure were in conformity with sections 74 and 75.*

For the purpose of this section, the calculated heat loss must not take into account the solar heat gain.

O.C. 89-83, s. 77.

78. *Despite section 74 and subject to the Regulation respecting the quality of the work environment (chapter S-2.1, r. 11), where the winter indoor design temperature is less than 18 ºC, the minimum thermal resistance R_1 shall be determined in conformance with the following formula:*

$$R_1 = \frac{t_i - t_o}{18 - t_o} \bullet R_t$$

Where

t_i = *winter indoor design temperature in ºC*

t_o = *outdoor design temperature for heating in ºC*

R_t = *thermal resistance required in section 74 and 75 in* $m^2 \bullet ºC/W$

This section does not apply to residential occupancy buildings and to hospitals or aid centres.

O.C. 89-83, s. 78.

79. *The thermal resistance prescribed in sections 74 and 75 for roofs and ceilings separating heated space from unheated space or the outside air may be reduced near the roof eaves to the extent made necessary by the roof slope and required ventilation clearances. However, the thermal resistance directly above the inner surface of the exterior wall shall be at least 2.1* $m^2 \bullet ºC/W$.

O.C. 89-83, s. 79.

80. *Every foundation wall having more than 50% of its area exposed to the outside air and those parts of a foundation wall that are of wood-frame construction shall have a minimum thermal resistance equal to the requirements of section 74 for walls above ground.*

O.C. 89-83, s. 80.

DIVISION 3

GLAZING

81. *Glazing that separates heated space from unheated space or the outside air must conform to the requirements of Division 3 of Chapter 4, with the exception of section 63 which does not apply. However, an exterior door protected by an enclosed unheated vestibule or a revolving door, may be equipped with single glazing.*

O.C. 89-83, s. 81.

DIVISION 4

DOORS

82. *Doors shall conform to the requirements of Division 4 of Chapter 4 and be designed to reduce air infiltration in conformity with the requirements of Division 5 of this Chapter.*

O.C. 89-83, s. 82.

DIVISION 5

AIR TIGHTNESS

83. *Air tightness of the enclosure of the building must be ensured in conformity with Division 5 of Chapter 4.*

O.C. 89-83, s. 83.

84. *Any door that separates heated space from the outside air must be protected by an enclosed vestibule, designed so that it can be crossed without having to open the interior door and the exterior door at the same time, except for:*

(*1*) *a revolving door;*

(*2*) *a door used primarily to facilitate vehicular movement or material handling;*

(*3*) *an exit door used exclusively for evacuation;*

(*4*) *a door giving direct access to an enclosed space measuring not more than 150 m^2.*

O.C. 89-83, s. 84.

85. *Any door opening on a vestibule or to the outside shall be equipped with an automatic closing device with the exception of a door mentioned in paragraphs 1 and 2 of section 84.*

O.C. 89-83, s. 85.

CHAPTER 6

HEATING, COOLING AND VENTILATION

DIVISION 1

SCOPE

86. *This Chapter applies to heating, cooling and ventilation systems for public buildings whose design is based on human comfort and installed for this purpose.*

O.C. 89-83, s. 86.

DIVISION 2

DESIGN

87. *The design of heating, cooling and ventilation systems, including heat losses and gains, shall conform to the methods described in the document entitled 1989 ASHRAE Handbook, Fundamentals.*

O.C. 89-83, s. 87; O.C. 1211-92, s. 12.

88. *(Revoked).*

O.C. 89-83, s. 88; O.C. 1211-92, s. 13.

DIVISION 3

ENERGY FOR FAN OPERATION

89. *The design power input required to operate air moving fans in cooling systems shall not exceed 25% of the total design rate of sensible heat removed from the space, expressed in watts.*

O.C. 89-83, s. 89.

90. *Except for residential occupancy buildings, hospitals, aid or detention centres, mechanically ventilated buildings shall be equipped with automatic controls to permit a reduction in fan energy consumption during periods when the buildings are not in use, and such controls must allow for manual override.*

O.C. 89-83, s. 90.

DIVISION 4

TEMPERATURE CONTROL

91. *Except in a dwelling unit heated by a coal or wood burning appliance contained within the dwelling unit, the air temperature in those parts of a building that are designed to be heated or cooled shall be controlled by a thermostat in each temperature controlled zone.*

O.C. 89-83, s. 91.

92. *(Revoked).*

O.C. 89-83, s. 92; O.C. 1211-92, s. 13.

93. *(Revoked).*

O.C. 89-83, s. 93; O.C. 1721-85, s. 14; O.C. 1211-92, s. 13.

94. *A thermostat that can be used to simultaneously control heating and cooling systems shall have a difference of at least 1.5 ºC between the activating temperature of the cooling cycle and the shut-off temperature of the heating cycle.*

O.C. 89-83, s. 94; Erratum, 1985 G.O. 2, 3709; O.C. 1211-92, s. 14.

95. *Except for residential occupancy buildings, hospitals, aid or detention centres, heated buildings shall be equipped with temperature controls to permit an automatic reduction in heating energy demand during periods when the buildings are not in use and these controls must allow for manual override.*

O.C. 89-83, s. 95.

DIVISION 5

TEMPERATURE CONTROLLED ZONES

96. *Any building that is to be heated or cooled must include at least one separate temperature controlled zone for:*

(*1*) *each heating or cooling system;*

(*2*) *each storey;*

(*3*) *a single room or series of rooms operated under a single tenancy, such as a dwelling unit, individual guest room in a motel or hotel, or a business and personal services occupancy;*

(*4*) *each grouping of rooms or enclosed spaces where the heating or cooling requirements are sufficiently similar to permit similar comfort conditions to be maintained by a single thermostat; and*

(*5*) *each vestibule with heating equipment.*

O.C. 89-83, s. 96; O.C. 1721-85, s. 15.

97. *(Revoked).*

O.C. 89-83, s. 97; O.C. 1721-85, s. 16.

DIVISION 6

SIMULTANEOUS HEATING AND COOLING

98. *(Revoked).*

O.C. 89-83, s. 98; O.C. 1721-85, s. 16.

99. *Any system serving a single temperature controlled zone shall be equipped with controls preventing simultaneous heating and cooling.*

O.C. 89-83, s. 99.

100. *Constant volume heating and cooling systems that use reheat and which serve more than one temperature controlled zone must be equipped with controls that will automatically reset the temperature of the cold air supply to the highest temperature that will satisfy the temperature controlled zone requiring the coldest air.*

O.C. 89-83, s. 100; O.C. 1721-85, s. 17.

101. *Air systems that serve more than one temperature controlled zone, such as multiple-zone and dual-duct systems, shall be provided with controls that will automatically reset the temperature of the cold air*

supply to the highest temperature that will satisfy the temperature controlled zone requiring the coldest air and reset the temperature of the hot air supply to the lowest temperature that will satisfy the temperature controlled zone requiring the hottest air.

O.C. 89-83, s. 101.

102. *Systems in which heated air is cooled to provide the desired temperature in a temperature controlled zone shall be provided with controls that will automatically reset the temperature at which the supply air is heated to the lowest temperature that will satisfy the zone requiring the hottest air.*

O.C. 89-83, s. 102.

103. *Sections 100 to 102 do not apply to a system with a capacity lower than 2,500 L/s of air.*

O.C. 89-83, s. 103; O.C. 1721-85, s. 18.

104. *Any heating and cooling system shall be designed so that concurrent operation of independent systems serving the same space is minimized by one of the following means:*

(*1*) *sequential temperature control for both heating and cooling in each temperature controlled zone;*

(*2*) *limitation of heating energy input by automatic resetting of the energy input rate to the minimum value required to balance heat losses due to the transmission and infiltration of air and the ventilation of such space.*

O.C. 89-83, s. 104.

DIVISION 7

COOLING WITH OUTSIDE AIR

105. *Each cooling system having an air handling capacity of more than 1,200 L/s or 20 kW of total cooling capacity shall be designed to introduce outside air up to the total capacity of the system when this method of cooling results in a decrease of the overall energy consumption.*

O.C. 89-83, s. 105.

106. *The introduction of outdoor air for cooling as required in section 105 shall be initiated automatically upon the signal of a dry bulb temperature sensor or an outdoor air enthalpy sensor.*

O.C. 89-83, s. 106.

107. *Section 105 does not apply where all space cooling is accomplished by dissipating the heat to the outdoor air by means of a cooling tower similar heat dissipating system without the use of refrigeration equipment.*

O.C. 89-83, s. 107.

108. *Section 105 does not apply where the heat recovered from the cooling system is used for other purposes and results in the reduction of the annual total energy consumption.*

O.C. 89-83, s. 108.

DIVISION 8

PIPE INSULATION

109. *Any piping used in the heating or cooling of a building, and carrying a fluid with a temperature of less than 13 °C or more than 50 °C, must be provided with thermal insulation in accordance with the*

requirements of the following Table, when the heat loss or heat gain from the piping will increase the energy requirements of the building for lack of insulation.

However, this provision does not apply to piping in heated spaces in a dwelling unit that serves only that unit, or piping that is part of a heating or cooling unit.

TABLE

(s. 109)

Insulation thickness (1) in mm

Fluid temperature range °C	Nominal pipe size				
	1 in and less	1 1/4 to 2 in	2 1/2 to 4 in	5 and 6 in	8 in and +
151 - 240	64	64	76	89	89
121 - 150	51	64	64	76	76
96 - 120	38	38	51	51	51
50 - 95	25	25	38	38	38
5 - 13	13	19	25	25	25
below 5	25	38	38	38	38

Note:

1. The above Table is based on insulation with a thermal resistivity in the range of 28 to 32 m°C/W, where the thermal resistivity is determined by using the thermal conductivity measured at an average temperature of 24 °C in accordance with ASTM-C177-85, Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded Hot Plate Apparatus. For insulation with a thermal resistivity of less than 28 m°C/W, the thickness is determined by multiplying the thickness values in the Table by 28/R, where R is the actual thermal resistivity of the insulation. For insulation with a thermal resistivity of more than 32 m°C/W, the thickness is determined by multiplying the thickness values in the Table by 32/R, where R is the actual thermal resistivity of the insulation.

O.C. 89-83, s. 109; O.C. 1721-85, s. 19; O.C. 1211-92, s. 15.

DIVISION 9

AIR DUCT INSULATION

110. *Where the design temperature difference between ambient air and within a plenum of duct exceeds 15 ºC, the duct or plenum shall be insulated to provide a thermal resistance, expressed in m^2 • °C/W numerically equal to at least 0.02 times the difference in temperature in ºC.*

O.C. 89-83, s. 110.

111. *Section 110 does not apply to air ducts located in heated spaces in dwelling units.*

O.C. 89-83, s. 111.

112. *Air ducts that circulate heated or cooled air and are located outside of the insulated portion of the building shall be insulated as required in section 51 for walls above ground level, other than foundation walls, separating heated space from unheated space or the outside air.*

O.C. 89-83, s. 112.

DIVISION 10

AIR DUCT CONSTRUCTION AND INSTALLATION

113. *Joints of supply air ducts situated outside heated spaces in a dwelling unit shall be sealed.*

O.C. 89-83, s. 113.

114. *Ducts with air velocities exceeding 10 m/s or gauge pressures exceeding 1,000 Pa shall be pressure tested in conformance with SMACNA HVAC Duct Construction Standards (1st edition, 1985), and the rate of air leakage shall not exceed the value specified in this Standard.*

O.C. 89-83, s. 114; O.C. 1211-92, s. 16.

115. *Subject to Sentence 4 of Articles 6.2.2.4 to 6.2.2.6 of the National Building Code 1990, every exhaust or supply duct or opening of a heating, cooling or ventilation system located inside the insulated portion of the building, except those for combustion air, must be equipped with a power-assisted damper located near the building exterior, and must be designed to close automatically when the system is not in operation. However, where the size of a duct does not exceed 0.1 m^2 in cross sectional area, the damper in the exhaust duct or opening may consist of a backflow damper of the gravity type, and that of the supply air duct or opening may be manually operated.*

O.C. 89-83, s. 115; O.C. 1721-85, s. 20; O.C. 1211-92, s. 17.

116. *Subject to Sentence 4 of Articles 6.2.2.4 to 6.2.2.6 of the National Building Code 1990, air cooling or ventilation ducts linked to heating, cooling or ventilation equipment located outside the insulated portion of the building must be equipped with power-assisted dampers located near the insulated portion and designed to close automatically when the system is not in operation.*

Where the heating, cooling or ventilation equipment is insulated, the dampers prescribed in the first paragraph may be replaced by power-assisted dampers located at the supply and exhaust air openings of the equipment.

O.C. 89-83, s. 116; O.C. 1721-85, s. 21; O.C. 1211-92, s. 17.

117. *Subject to Sentence 4 of Articles 6.2.2.4 to 6.2.2.6 of the National Building Code 1990, equipment used exclusively to discharge contaminated air to the outside must be equipped with a damper that is power-assisted or of the gravity type.*

O.C. 89-83, s. 117; O.C. 1721-85, s. 22; O.C. 1211-92, s. 17.

118. *Power operated dampers prescribed in sections 115 to 117 must be designed so that air flow with the damper in the closed position does not exceed 50 L/s per square metre of cross sectional area at a gauge pressure of 250 Pa.*

O.C. 89-83, s. 118.

DIVISION 11

HEATING SYSTEM BALANCING

119. *In order to control heating in the rooms of a dwelling unit heated by gas, oil, electricity or solar energy, automatic or manually operated devices such as switches, valves or dampers appropriate for the heating system used shall be provided.*

O.C. 89-83, s. 119.

DIVISION 12

EQUIPMENT REQUIREMENTS

§ 1. — Atmospheric pressure relative to the coefficient of performance

120. *The coefficient of performance of equipments and their components mentioned in sections 122, 126, 130 and 132 shall be determined at an atmospheric pressure of 101.3 kPa.*

O.C. 89-83, s. 120.

§ 2. — Electrically operated equipment for air cooling

121. *In this Subdivision, "coefficient of performance" means the ratio between the energy removed from the air of the room, measured by considering the change in enthalpy between room air entering the electrically operated equipment and room air leaving the equipment, without reheat, to the total electrical energy input to all components of the air-cooling equipment, including compressors, pumps, supply-air fans, return-air-fans, condenser-air fans, cooling tower fans and pumps, and the equipment control circuit.*

O.C. 89-83, s. 121.

122. *Except for equipment mentioned in section 123, unitary electrically operated cooling equipment including air-cooled, water-cooled, and evaporative-cooled types, packaged terminal air-conditioners and room air-conditioners shall have a coefficient of performance in cooling of at least 1.99 when their rated capacity is lower than 19 kW and at least 2.2 when their rated capacity is 19 kW or more.*

O.C. 89-83, s. 122.

123. *Independent heat pumps used for cooling purposes shall comply with CAN/CSA-C273.3-M91, Performance Standard for Split-System Central Air-Conditioners and Heat Pumps.*

O.C. 89-83, s. 123; O.C. 1211-92, s. 18.

124. *The coefficient of performance for the equipment mentioned in section 122 shall be determined on the basis of the rating conditions in the following table and in section 127.*

TABLE

(s. 124)

Heating or cooling medium	Air temperature, °C		Water temperature, °C
	Dry bulb	Wet bulb	
Air, entering equipment	26.7	19.4	-
Air, surrounding air-cooled condenser	35	23.9	-
Water, condenser inlet	-	-	29.4
Water, condenser outlet	-	-	35

O.C. 89-83, s. 124.

§ 3. — Electrically operated cooling system components

125. *In this Subdivision, "coefficient of performance" means the ratio between the difference in total energy of the water or the refrigerant at the intake and at the outlet of the component and the total energy input to this component.*

O.C. 89-83, s. 125.

126. *The coefficient of performance in cooling for heating, cooling and ventilating system components, the energy input of which is entirely electrical, shall be not less than the values shown in the table below:*

TABLE

(s. 126)

Minimun coefficient of performance of system components for cooling

	Centrifugal compressors	*Reciprocating compressors*
Water chillers with:		
air-cooled condensers	*2.28*	*2.20*
water-cooled condensers	*3.98*	*3.40*
Water chillers with:		
remote air-cooled condensers	*-*	*2.78*
remote water-cooled condensers	*-*	*3.40*
Compressors with a condensing unit 19 kW and over:		
air-cooled condensers	*-*	*2.50*
water-cooled condensers	*-*	*3.48*

O.C. 89-83, s. 126.

127. *The coefficient of performance mentioned in section 126 for water chillers and water source heat pumps shall be determined on the basis of the rating conditions in the following table. Except for refrigerants, these conditions shall include a fouling factor for tubes equal to 0.00018 m^2 • °C/W; however, this factor may be reduced by half when non-ferrous tubes are used.*

TABLE

(s. 127)

Temperatures for standard rating conditions for water chillers and heat pumps, °C

	Type of water chillers		
	a) centrifugal compressors b) self-contained reciprocating compressors	Reciprocating without integral condensers	Hydronic system water source heat pumps
Water temperature leaving chiller	6.7	6.7	–
Water temperature entering chiller	12.2	12.2	–
Water temperature leaving condenser	35.0	–	35.0
Water temperature entering condenser	29.4	–	29.4
Air temperature entering indoor portion of heat pump	–	–	26.7 dry bulb 19.4 wet bulb
Air temperature surrounding air or evaporative cooled condenser	35.0 dry bulb 23.9 wet bulb	–	–
Refrigerant saturation temperature at the discharge of water or evaporative cooled compressor	–	40.6	–
Refrigerant saturation temperature at the discharge of air-cooled compressor	–	48.9	–

Liquid refrigerant temperature for water or evaporative cooled condenser	–	*35.0*	–
Liquid refrigerant temperature for air-cooled condenser	–	*43.3*	–
Air temperature surrounding heat pump	–	–	*26.7*

O.C. 89-83, s. 127.

128. *The coefficient of performance mentioned in section 126 for a compressor with a condensing unit shall be determined in accordance with Chapter 6 and Table 4 of ARI 520-85, Standard for Positive Displacement Refrigerant Compressor and Condensing Units.*

O.C. 89-83, s. 128; O.C. 1211-92, s. 19.

§ 4. — Heat-operated cooling equipment

129. *In this Subdivision, "coefficient of performance" means the ratio between the net amount of energy removed from the water in the cooling cycle and the total heat input, except for secondary electric equipment energy input.*

O.C. 89-83, s. 129.

130. *The coefficient of performance for heat-operated cooling equipment, including absorption equipment, internal combustion engine driven equipment and turbine driven equipment shall be at least 0.48 if the supply is direct, by oil or gas; and at least 0.68 if it is indirect, by steam or hot water. This section does not apply to cooling systems powered by solar heat or evacuated heat that cannot be used elsewhere in the building.*

O.C. 89-83, s. 130.

§ 5. — Heat pumps for heating

131. *In this Subdivision, "coefficient of performance" means the ratio between the energy added to the air as measured by taking into account the change in the enthalpy of the air entering and leaving the heat pump, exclusive of supplementary heat, and the total energy input to all elements of the heat pump including compressors, pumps, supply-air fans, return-air fans, outside-air fans, cooling tower fans and pumps, and the equipment control circuit, but not including supplementary heaters.*

O.C. 89-83, s. 131; Erratum, 1985 G.O. 2, 3709.

132. *Except for the equipment mentioned in section 134, the coefficient of performance for heat pumps used for heating, including unitary heat pumps and heat pumps in packaged terminal unit forms shall be at least 2.5; however, this coefficient shall be at least 1.5 where pumps operate from air sources and the standard rating conditions are a dry bulb temperature of -8.3 ºC and a wet bulb temperature of -9.4 ºC.*

O.C. 89-83, s. 132.

133. *The coefficient of performance prescribed in section 132 shall be determined from the standard rating conditions appropriate for the equipment, but not less than values shown in the table below.*

TABLE

(s. 133)

Standard rating conditions for heat pumps used for heating

	Heat source		
	Air		Water
Location of temperature measurement	**Condition No. 1**	**Condition No. 2**	
Air entering equipment	21.1 °C dry bulb temperature	21.1 °C dry bulb temperature	21.1 °C dry bulb temperature
Ambient air of outdoor portion of unit	dry bulb temperature: 8.3 °C wet bulb temperature: 6.1 °C	dry bulb temperature: -8.3 °C wet bulb temperature: -9.4 °C	–
Water entering equipment	–	–	15.6 °C

O.C. 89-83, s. 133.

134. *Independent heat pumps used for heating purposes shall comply with CAN/CSA-C273.3-M91, Performance Standard for Split-System Central Air-Conditioners and Heat Pumps.*

O.C. 89-83, s. 134; O.C. 1211-92, s. 20.

135. *Every heat pump used for heating shall be equipped with controls to prevent the operation of supplementary electrical heaters when the heat pump capacity is sufficient to meet the heating demands. However, during start-ups, thermostat setting or during periods of defrost, the supplementary heating units may be used.*

O.C. 89-83, s. 135.

DIVISION 13

HEAT RECOVERY SYSTEMS

136. *A system that exhausts air to the outside of a building shall be provided with heat recovery apparatus when the sensible heat content of the exhaust air system, calculated in conformance with sections 137 and 138, exceeds 300 kW and is immediately reusable.*

O.C. 89-83, s. 136.

137. *When the temperature of the exhaust air does not exceed 30 ºC, the sensible heat content of the exhaust air in kilowatts shall be calculated by using the formula:*

C_s: *0.00123 Q* $(t_e - t_o)$

Where

C_s: *sensible heat content in kW*

Q: rated capacity of the building exhaust air system at normal exhaust air temperature in L/s

t_e: *temperature of the exhaust air before passing through any heat recovery apparatus in ºC*

t_o: *outdoor design temperature for heating purposes in ºC.*

O.C. 89-83, s. 137.

138. *When the temperature of the exhaust air exceeds 30 ºC, the sensible heat content of the exhaust air in kilowatts shall be calculated by using the formula:*

$$C_s = \frac{Q \cdot c\,(t_c - t_o)}{1{,}000 \cdot V}$$

Where

C_s = *sensible heat content in KW*

Q = *rated capacity of the building exhaust air system in L/s*

c = *specific heat of the exhaust air at exhaust air conditions in kJ/(kg • ºC)*

v = *specific volume of the exhaust air at exhaust air conditions in* m^3/kg

t_e = *temperature of the exhaust air before passing through any heat recovery apparatus in ºC*

t_o = *outdoor design temperature for heating purposes in ºC.*

O.C. 89-83, s. 138.

139. *Heat recovery apparatus required in section 136 shall be capable of recovering at least 40% of the total sensible heat content of the air exhausted from the building as calculated in sections 137 and 138.*

O.C. 89-83, s. 139.

140. *Buildings with air cooling systems shall be designed to recover heat that would otherwise be rejected by the condenser water where the maximum amount of heat that can be recovered exceeds 600 kW and is immediately reusable.*

O.C. 89-83, s. 140.

141. *An exhaust system in a residential occupancy building is not subject to sections 136 to 140 when each fan in this system:*

(*1*) *can be individually operated from within the served area;*

(*2*) *is used for only one room or a group of adjoining rooms used by only one tenant or owner; and*

(*3*) *has a capacity of not more than 70 L/s.*

O.C. 89-83, s. 141.

CHAPTER 7

SERVICE WATER HEATING

DIVISION 1

SCOPE

142. *This Chapter applies to service water heating systems for all buildings.*

Despite the first paragraph, only Division 2 applies for service water heating systems of single-family houses designed and built in conformity with Chapter 3.

O.C. 89-83, s. 142.

DIVISION 2

THERMAL EFFICIENCY OF WATER HEATERS

143. *The stand-by loss for electric service water heater storage tanks must not exceed the values permitted in CSA C191 Series-M90, Performance of Electric Storage Tank Water Heaters and not exceed 43 W/m^2 of tank surface.*

O.C. 89-83, s. 143; O.C. 1211-92, s. 21.

144. *The hourly stand-by loss expressed as a percentage shall not be higher than 4.3 + 0.25/v for gas or oil-fired service water heater storage tanks, where v is the tank volume in m^3.*

O.C. 89-83, s. 144.

145. *Gas-fired and oil-fired service water heaters shall have a thermal efficiency of not less than 70%.*

O.C. 89-83, s. 145.

146. *The stand-by loss percentage and the thermal efficiency mentioned in sections 144 and 145 shall be determined in conformance with the method described in CAN1-4.1-M85 Gas-Fired Automatic Storage Type Water Heaters with Inputs less than 75,000 Btu/h. In the case of oil-fired service water heaters, the heat input Q • H referred to in the Standard shall be determined by multiplying the total volume of oil used in the test by the heating value of the oil.*

O.C. 89-83, s. 146; O.C. 1211-92, s. 22.

DIVISION 3

THERMAL INSULATION

147. *Service hot water storage tanks shall be insulated in conformance with the requirements of section 109 applicable to the insulation of pipes of 8 in nominal size and larger.*

Sections 143 and 144 also apply, with the necessary modifications, to service hot water storage tanks.

O.C. 89-83, s. 147.

148. *Piping for recirculating service hot water must be insulated in conformance with the requirements of section 109 for pipes containing fluids at a temperature of between 50 ºC and 95 ºC.*

O.C. 89-83, s. 148.

DIVISION 4

HEATED SWIMMING POOLS

149. *Heated swimming pools that are part of public buildings, except for pools used for therapeutic purposes, shall be equipped with controls to shut off the supply of gas, oil or electricity when water temperature reaches 27 ºC.*

O.C. 89-83, s. 149.

150. *Heated outdoor swimming pools that are part of public buildings shall be provided with an automatic shut-off which cuts the supply of gas, oil or electricity when the outdoor air temperature measured in the shade falls below 10 ºC.*

O.C. 89-83, s. 150.

151. *Heated outdoor swimming pools that are part of public buildings shall be equipped with insulated removable covers that can cover the whole water surface, except if pool water is solar heated.*

O.C. 89-83, s. 151.

CHAPTER 8

ELECTRIC LIGHTING

DIVISION 1

SCOPE

152. *This Chapter applies to public buildings except inside dwelling units.*

O.C. 89-83, s. 152.

DIVISION 2

SWITCHES

153. *Except for stair shafts and corridors used by the public, switches must be installed in accessible locations within sight of the lights controlled, or grouped in a centralized station of the building, provided that the area controlled by each switch is clearly identified.*

O.C. 89-83, s. 153; O.C. 1721-85, s. 23.

154. *Where task lighting is installed other than in the ceiling, such lighting shall be provided with switches located adjacent to the work stations served.*

O.C. 89-83, s. 154.

DIVISION 3

LIGHTING FIXTURES

155. *The electrical load of all wired-in and plugged-in lighting fixtures, including ballasts and other control gear, may not exceed an average of:*

(*1*) *22 W/m^2 of floor area for office spaces exceeding 100 m^2, in major occupancies classified as business and personal services occupancies; and*

(*2*) *85 W/m^2 of floor area for major occupancies classified as mercantile occupancies and whose floor area exceeds 100 m^2. However, in an occupancy with rooms used for retail sale and linked by inside corridors, the electric load for all the lighting fixtures in those rooms may not exceed an average of 85 W/m^2 of floor area for all the rooms, or an average of 50 W/m^2 for the occupancy.*

O.C. 89-83, s. 155; O.C. 1721-85, s. 24.

CHAPTER 9

FINAL PROVISION

156. *(Omitted).*

O.C. 89-83, s. 156.

SCHEDULE 1

(s. 5)

OUTDOOR DESIGN TEMPERATURE

Municipalities	***°C***
Acton-Vale	*- 24*
Alma	*- 30*
Amos	*- 34*
Ancienne-Lorette	*- 25*
Anjou	*- 23*
Asbestos	*- 26*
Aylmer	*- 25*
Baie-Comeau	*- 27*
Beaconsfield	*- 23*
Beauport	*- 25*
Bécancourt	*- 25*
Bedford	*- 23*
Beloeil	*- 24*
Brossard	*- 24*
Buckingham	*- 26*
Cacouna (Saint-George-de)	*- 25*
Campbell's-Bay	*- 28*
Chicoutimi	*- 30*
Coaticook	*- 24*
Contrecoeur	*- 24*
Côte-Nord-du-Golfe-Saint-Laurent	*- 25*
Cowansville	*- 24*
Dolbeau	*- 31*
Dorval	*- 23*
Drummondville	*- 25*
Farnham	*- 24*
Fort-Coulonge	*- 28*
Gagnon	*- 33*
Gaspé	*- 23*
Gatineau	*- 25*
Gracefield	*- 28*
Granby	*- 25*
Havre-aux-Maisons	*- 20*
Havre-Saint-Pierre	*- 27*
Hemmingford	*- 23*
Hull	*- 25*
Iberville	*- 24*
Inukjuak	*- 38*
Joliette	*- 25*
Jonquière	*- 29*
Kuujjuaq (Fort-Chimo)	*- 39*
La Baie	*- 31*
Lac-Brome	*- 24*

O.C. 89-83, Sch. 1.

SCHEDULE 2

(ss. 34, 37, 38, 51, 59 and 74)

ZONES AND MUNICIPALITIES

Zone A:

Abercorn

Acton-Vale

Asbestos

Bedford

Beloeil

Berthierville

Blainville

Brome

Bromptonville

Brossard

Communauté urbaine de l'Outaouais

Communauté urbaine de Montréal

Contrecoeur

Cowansville

Drummondville

Farnham

Granby

Havre-Aux-Maisons

Hemmingford

Huntingdon

Iberville

Joliette

Kingsey

Lac-Brome

L'Assomption

Laval

Lavaltrie

Lennoxville

Léry

Les Cèdres

Magog

Montebello

Oka

Philipsburg

Richmond

Rigaud

Rosemère

Rougemont

Saint-Bruno-de-Montarville

Sainte-Clothilde (Cté Huntingdon)

Saint-Guillaume (Cté Nicolet)

Saint-Hubert (Cté Vachon)

Saint-Hyacinthe

Saint-Jean-sur-Richelieu

Saint-Lambert (Cté Laporte)

Saint-Laurent (Cté L'Acadie)

Saint-Lazare (Cté Vaudreuil-Soulanges)

Saint-Mathieu (Cté Châteauguay)

Sherbrooke

Sorel

Stanstead

Sutton

Thurso

Valleyfield (Salaberry-de-)

Varennes

Verchères

Waterloo

Windsor

Zone B:

Armagh

Baie-Saint-Paul

Beauceville

Bécancour

Bic

Bonaventure

Bowman

Cacouna (Saint-Georges-de)

Campbell's-Bay

Cap-Chat

Cap-de-la-Madeleine

Caplan

Coaticook

Communauté urbaine de Québec

Disraëli

Donnacona

East-Angus

Fort-Coulonge

Gaspé

Gracefield

Grande-Rivière

Hereford

Honfleur

Huberdeau

Lachute

Lac-Nominingue

Lac-Mégantic

La Malbaie

Lambton

La Patrie

La Pocatière

Laurentides

Lévis

Linière

Louiseville

Luceville

Maniwaki

Milan

Mirabel

Mont-Joli

Mont-Laurier

Montmagny

New-Richmond

Nicolet

Notre-Dame-du-Laus

Percé

Plessisville

Pointe-au-Père (Ste-Anne-de-la)

Port-Daniel (parties Est et Ouest)

Price

Rimouski

Rivière-du-Loup

Sainte-Agathe-des-Monts

Saint-Alban

Sainte-Anne-de-la-Pérade

Sainte-Catherine (Cté Chauveau)

Saint-Côme (Cté Berthier)

Saint-Donat (Cté Rousseau)

Saint-Elzéar (Cté Bonaventure)

Saint-Éphrem-de-Beauce

Saint-Eugène (Cté de Montmagny-L'Islet)

Sainte-Françoise (Cté Rivière-du-Loup)

Saint-Gabriel-de-Brandon

Saint-Gédéon (Cté Beauce-Sud)

Saint-Jean-de-Brébeuf

Saint-Jérôme

Saint-Jovite

Saint-Malachie (Cté Bellechasse)

Saint-Malo

Saint-Paulin (Cté Maskinongé)

Saint-Raphaël (Cté Bellechasse)

Saint-Raymond

Saint-Rémi (Cté Portneuf)

Saint-Théophile

Saint-Tite (Cté Laviolette)

Scott

Shawinigan

Shawville

Thetford-Mines

Trois-Pistoles

Trois-Rivières

Valcartier (Saint-Gabriel-de-)

Victoriaville

Zone C:

Albanel

Albertville (Saint-Raphaël-d')

Alma

Amqui

Baie-Comeau

Causapscal

Chicoutimi

Chute-aux-Outardes

Dégelis

Delisle

Dolbeau

Forestville

Grandes-Bergeronnes

Grande-Vallée

Havre-Saint-Pierre

Île-d'Anticosti

Jonquière

La Baie

Labrecque

Laterrière

Matane

Matapédia

Mistassini

Mont-Louis (Saint-Maxime-du-)

Normandin

Notre-Dame-du-Lac

Péribonka

Petit-Saguenay

Pohénégamook

Port-Cartier

Rivière-au-Tonnerre

Rivière-Bleue

Roberval

Saint-Alexis-de-Matapédia

Saint-Ambroise (Cté Dubuc)

Saint-Antonin

Saint-Camille-de-Lellis

Saint-Charles-Garnier

Saint-Clément

Saint-Félicien

Saint-Ferréol-les-Neiges

Saint-Guy

Saint-Jean-de-Cherbourg

Sainte-Germaine-du-Lac-Etchemin

Sainte-Lucie-de-Beauregard

Saint-Pamphile

Sainte-Perpétue

Saint-Urbain

Sept-Îles

Shipshaw

Squatec (Saint-Michel-du)

Tadoussac

Témiscaming

Trinité-des-Monts

Ville-Marie

Woodbridge

Zone D:

Amos

Côte-Nord-du-Golfe-St-Laurent

Haute-Mauricie

Lac-Bouchette

La Tuque

Malartic

Murdochville

Natashquan

Noranda

Parc des Laurentides

Parent

Senneterre

Val-d'Or

Zone E:

Municipalities between the 51st and the 53rd parallel

Zone F:

Municipalities north of the 53rd parallel.

O.C. 89-83, Sch. 2; O.C. 1211-92, s. 23.

UPDATES
O.C. 89-83, 1983 G.O. 2, 775 and 1985 G.O. 2, 3709
O.C. 1721-85, 1985 G.O. 2, 3840
O.C. 1211-92, 1992 G.O. 2, 4348