

SECTION C701 STRETCH GUIDELINES

C701 Introduction and scope.

This document is the 2019 Vermont Commercial Building Stretch Guidelines (CBSG). Commercial buildings subject to the CBSG shall comply with the 2019 Vermont Commercial Building Energy Standards (CBES) and the provisions detailed in both Table C701 and Section C701.1. References to Sections C101 through C505 as well as Section CA101 through CA103 are references to the CBES.

TABLE C701 Stretch Guidelines

Item Number	Base Code Description	Stretch Guidelines Description	Source
1.	C202	Group R-2, R-3, R-4 buildings with 20 or more dwelling or sleeping units are classified as commercial buildings	N/A
2.	C401.2.1 Table C4.2.1.1	New buildings must comply with the stricter BPF Table C701.1 (1)	N/A
3.	C402 Table 402.1(1) C406.8	New buildings must comply with Building Envelope Requirements	IECC 2018 Climate Zones 7 and 8
4.	None	New buildings must seal and insulate new fireplaces and follow all rules outlined in C701.1 (1)	2015 Vermont Residential Energy Code (RBES)
5.	C402.4 C406.9	New buildings must comply with stricter air leakage rates	NA
6.	C403.3.2 Tables C403.3.2 (1) - (9)	All HVAC equipment shall be 20% more efficient	NA
7.	C403	Dedicated outdoor air system	NA
8.	C403.9.5	Heat recovery for service water heating – applies to units 50% smaller systems	NA
9.	C403.10.1.7 C403.10.1.8	Walk in coolers – all fan motors shall be ECM	NA
10.	C403.10.4.1.2	Condensers serving refrigeration systems – all fan motors shall be ECM	NA
11.	C405.1	Dwelling unit and sleeping unit illumination levels from permanent fixtures is specified	NA
12.	C405.2.1	Parking garages must have occupancy sensor lighting controls	ASHRAE 90.1 2016
13.	C405.3 C406.3	New buildings must comply with stricter interior LPD	New Buildings Institute
14.	C405.4	New buildings must comply with stricter exterior LPD	New Buildings Institute
15.	None	New buildings with a roof area between 2,000-20,000SF must be “solar rooftop ready”	2015 State of Massachusetts Energy Code
16.	C406.1	Increase number of credits to (9)	NA

C701.1 Applicable provisions to 2019 CBES.

1. Residential building definition, Section C202 General Definitions

At the end of the definition of *residential building*, add, “Additionally, Group R-2, R-3, and R-4 buildings cannot have more than 19 dwelling or sleeping units to be considered a residential

building. Group R-2, R-3, and R-4 buildings with 20 or more dwelling or sleeping units are commercial buildings.”

2. Building performance factor table, Section C401.2.1 Applicable provisions to Standard 90.1-2016

Delete Table C4.2.1.1 and replace with Table C701.1(1)

TABLE C701.1(1) BUILDING PERFORMANCE FACTOR (BPF)

Building Area Type	Vermont Code Stretch
Multifamily	0.71
Healthcare/hospital	0.49
Hotel/motel	0.55
Office	0.52
Restaurant	0.54
Retail	0.47
School	0.42
Warehouse	0.57
All Others	0.49

3. Envelope performance, Section C402 Building Envelope Requirements

The total UA of the building thermal envelope as designed shall be not less than 15 percent below the total UA of the building thermal envelope for a building of identical configuration and fenestration area in accordance with Section C402.1.3.

For buildings whose envelope performance is used to comply with Section C406, in Section C406.8, delete 15 percent and replace with 30 percent.

4. Energy efficient fireplaces, Section C402.2 Specific building thermal envelope insulation requirements (Prescriptive)

Add a new section below Section C402.2.9 for efficient fireplaces. All fireplaces shall comply with the following provisions: C701.1 (1)

a. Gasketed doors.

All solid fuel-burning appliances and fireplaces shall have tight-fitting (defined as gasketed doors with compression closure or compression latch system) metal glass or ceramic doors.

Exception: Any building certified to have passed the Canadian General Standards Board 51.71 “Spillage Test” is not required to have tight-fitting doors. The CGSB Spillage Test creates a “worst-case” condition to determine whether the appliances can vent properly even with the house closed tight and all the exhaust equipment running.

b. Spillage testing.

All chimney-vented equipment shall establish complete draft without spillage under “worst-case” conditions within two minutes. If any chimney-vented equipment fails this requirement, mechanically induced pressure relief shall be provided such that the requirement is met.

c. Exterior air supply requirements.

Solid fuel-burning appliances and fireplaces shall be equipped with an exterior air supply meeting the following provisions:

- i. Combustion air shall not be taken from within parking areas, unfinished attics, or unfinished basements.

- ii. The exterior air inlet shall not terminate to the exterior higher than the firebox and shall not rise vertically within 18 inches of the firebox.
Exception: Where woodstove or fireplace is installed below grade (in a basement), air intake is permitted to terminate above the firebox if the combustion air supply point is below the firebox and the combustion air intake point is greater than 15 inches (381 mm) below the top of the wood stove or fireplace chimney.
- iii. The exterior air intake must deliver combustion air to the firebox.
Exception: For older woodstoves and cookstoves where direct connection of combustion air is not possible, combustion air may be delivered within 24 inches (610 mm) of the stove's air intake opening.
- iv. The air inlet shall be screened with ¼ inch (6 mm) mesh.
- v. The air inlet shall be closable and designed to prevent debris from dropping into the air intake.
- vi. The exterior air inlet shall be installed so as to remain free of obstruction from snow.
- vii. The combustion air passageway for unlisted exterior air supply ducts shall be a minimum of 6 square inches (3870 mm²) and not more than 55 square inches (0.035 m²). The passageway shall be non-combustible, masonry or 30 gauge (or thicker) metal, have 1 inch clearance to combustibles for the length of the combustion air intake. Combustion air systems for listed fireplaces shall be constructed according to the fireplace manufacturer's instructions

Exception: Factory-built fireplaces, masonry fireplaces and solid fuel-burning appliances that list exterior air supply ducts as optional or required for proper installation are permitted to be installed with those exterior air supply ducts according to the manufacturer's installation instructions.

5. Air infiltration, Section C402.4 Air leakage – thermal envelope (Mandatory)

In exception (2) remove 0.30 cfm/ft² and replace with 0.25 cfm/ft².

For buildings whose air infiltration is used to comply with Section C406, in Section C406.9, delete 0.25 cfm/ft² and replace with 0.20 cfm/ft².

6. Minimum Efficiency Requirements C403.3.2

All HVAC equipment shall be 20% more efficient than Tables C403.3.2 (1) through (9).

7. Dedicated outdoor air system, Section C403

Not less than 90% of the building conditioned floor area, excluding floor area of unoccupied spaces that do not require ventilation per the *International Mechanical Code*, shall be served by DOAS. Buildings containing equipment or systems regulated by Section C403.3.4, C403.4.3, C403.4.4, C403.4.5, C403.6, C403.8.4, C403.8.5, C403.8.5.1, C403.9.1, C403.9.2, C403.9.3 or C403.9.4 shall be equipped with an independent ventilation system designed to provide not less than the minimum 100-percent outdoor air to each individual occupied space, as specified by the *International Mechanical Code*. The ventilation system shall be capable of total energy recovery. The HVAC system shall include supply-air temperature controls that automatically reset the supply-air temperature in response to representative building loads, or to outdoor air temperatures. The controls shall reset the supply-air temperature not less than 25 percent of the difference between the design supply-air temperature and the design room-air temperature.

8. C403.9.5 Heat recovery for service water heating.

Condenser heat recovery shall be installed for heating or reheating of service hot water provided that the facility operates 12 hours a day, the total installed heat capacity of water-cooled systems

exceeds 3,000,000 Btu/hr (879 kW) of heat rejection, and the design service water heating load exceeds 500,000 Btu/h (147 kW).

The required heat recovery system shall have the capacity to provide the smaller of the following:

1. Sixty percent of the peak heat rejection load at design conditions.
2. The preheating required to raise the peak service hot water draw to 85°F (29°C).

Exceptions:

1. Facilities that employ condenser heat recovery for space heating or reheat purposes with a heat recovery design exceeding 30 percent of the peak water-cooled condenser load at design conditions.
2. Facilities that provide 60 percent of their service water heating from site solar or site recovered energy or from other sources.

9. C403.10.1 Walk-in coolers, walk-in freezers, refrigerated warehouse coolers and refrigerated warehouse freezers (Mandatory).

- a. Section C403.10.1.7, delete 'brushless direct-current motors, or 3-phase motors'. All evaporator fan motors less than 1 hp (0.746kW) shall use electronically commutated motors.
- b. Section C403.10.1.8, delete 'permanent split capacitor-type motors, or 3-phase motors'. All condenser fan motors less than 1 hp (0.746kW) shall use electronically commutated motors.

10. C403.10.4.1 Condensers serving refrigeration systems

Section C403.10.4.1.2 delete 'permanent split capacitor-type motors, or 3-phase motors'. All condenser fan motors less than 1 hp (0.746kW) shall use electronically commutated motors.

11. Dwelling unit and sleeping unit illumination requirement, Section C405.1 General (Mandatory)

At the end of section C405.1 add, "*Dwelling units and Sleeping Units* in all occupancy groups shall install lighting systems where the average horizontal illumination levels from permanent fixtures are not less than 10 foot-candles."

12. Parking garage lighting controls, Section C405.2.1 Occupant sensor controls

Add to the list of space types to have occupant sensor controls, parking garages.

Add a subsection on occupant sensor control function in parking garages with the following requirements:

- a. Parking garage lighting shall have *automatic* lighting shutoff.
- b. Lighting power of each *luminaire* shall be automatically reduced by a minimum of 30% when there is no activity detected within a lighting zone for 20 minutes. Lighting zones for this requirement shall be no larger than 3600 ft².
- c. Lighting for covered vehicle entrances and exits from *buildings* and parking structures shall be separately controlled by a device that automatically reduces the lighting by at least 50% from sunset to sunrise.
- d. The power to *luminaires* within 20 ft of any perimeter *wall* structure that has a net opening-to-*wall* ratio of at least 40% and no exterior obstructions within 20 ft, shall be automatically reduced in response to daylight by at least 50%.

Exceptions:

1. Lighting in daylight transitions zones and ramps without parking.

2. Lighting in spaces where patient care is rendered.
3. Lighting in spaces where *automatic shutoff* would endanger safety or security of building occupants.

13. Interior lighting power, Section C405.3 Interior lighting power requirements (Prescriptive)

The total connected interior lighting power calculated in accordance with Section C405.3.1 shall be 85 percent or less of the total interior lighting power value calculated in accordance with Section C405.3.2.1, or by using 85 percent of the total interior lighting power allowance calculated in accordance with Section C405.3.2.2.

Dwelling units and sleeping units within the building shall have lighting systems where not less than 95 percent of the lamps in permanently installed lighting fixtures shall be high-efficacy lamps or not less than 95 percent of the permanently installed lighting fixtures shall be high-efficacy fixtures or contain only high-efficacy lamps.

For buildings whose reduced lighting power is used to comply with Section C406, in Section C406.3.1, delete 90 percent and replace with 75 percent, and in Section C406.3.2 delete 80 percent and replace with 65 percent.

14. Exterior lighting power, Section C405.4 Exterior lighting power requirements (Prescriptive)

The total connected exterior lighting power calculated in accordance with Section C405.4.1 shall be 85 percent or less of the total exterior lighting power value calculated in accordance with Section C405.4.2.

15. Solar ready zone, Section C405.10 Renewable energy systems

At the end of Section C405.10 add the following new subsection:

Solar ready zone.

Building projects with footprint greater than 2,000 square feet, but less than or equal to 20,000 square feet shall have a solar ready zone. The solar ready zone shall comply with Section CA103 with the following provisions:

- a. In section CA103.1 delete, "are five stories or less in height above grade plane, and"
- b. In section CA103.1, delete exemption (1) and replace with, "A building with a permanently installed, on-site renewable energy system with a minimum rating of 3.7 W/ft² or 13 Btu/h-ft² (40 W/m²) multiplied by the horizontally-projected gross roof area, and must meet 10% of the projected energy use of the building for lighting, mechanical, and service water heating."

16. Enhanced energy efficiency options, Section C406.1 Additional energy efficiency credit requirements

Delete, "to achieve a minimum number of 6 credits," and replace with, "to achieve a minimum number of 9 credits."