

Commercial Building Energy Standard Comments and Responses on Draft Standards

What's the process to obtain interpretations of, or approval for variances to the code from the authority having jurisdiction?

- For code interpretations contact EVT/ECAC who will review the issue and respond with an answer or pass the issue onto the DPS. For variances first contact EVT who will work with you to see if you require a variance, if so they will direct you to contact the DPS who will review and determine if it is appropriate to grant a variance.

Will there be a "CBES Guide" available to assist with interpreting the code? Both ASHRAE and IECC publish support and commentary documents, which will align with the VT CBES.

- CBES is built based upon the 2015 IECC. The DPS consider these documents as support documents applicable to CBES, however all code interpretations should be sought from the DPS

Without enforcement the energy codes sets up a disadvantage for those who comply. There is no entity/resources to enforce this code.

- The PSD agrees that there is an issue where those who do not comply with the energy codes can reap benefits at the expense of those who do follow the legal requirements. The PSD outlined an extensive compliance plan to achieve further statewide compliance with the energy codes, which can be found on the PSD website. We have implemented most of the components of the plan that could be accomplished at little to no additional cost, but would need more resources to fully activate the plan.

Suggest interpretation section which references

ASHRAE 90.1-2013 User Manual or formal published interpretations, which are publically accessible.

- Publicly available interpretations of 90.1-2013 are encouraged to be used for justifications when seeking variances or interpretations for VT-specific applications (e.g., from PSD).

Designers and/or contractors are required to provide proof of compliance with the Energy Code. For other codes the enforcement agency reviews the plans and completed work to verify compliance with the codes

- In Vermont there is no dedicated agency for energy code enforcement that can review plans and completed work to verify compliance.

Chapter 1 Scope and Administration

Include ASHRAE 90.1-2013 scope language into the VT CBES section that specifies that equipment or building systems that are part of industrial or manufacturing processes are included only if they are specifically identified in the standard.

- Language has been inserted into Section C101.2 Scope as follows: *This code applies to commercial buildings and the buildings' sites and associated systems and equipment. This code provides minimum energy-efficient requirements for the design and construction, and a plan for operation and maintenance of new equipment or building systems specifically identified in the code that are part of industrial or manufacturing processes.*

C101.4 Applicability –reference the Existing Buildings Chapter (5), since that section was included in the Applicability section of the 2011 VT CBES.

- New language has been added as follows: **C101.4.2 Application to Existing Buildings.** Existing buildings shall follow the provisions of Chapter 5 of this code.

Low Energy Buildings - If a building is used seasonally (for instance, a lodge or summer camp), does the peak design energy usage apply, or can one apply an adjustment factor for the portion of the year the facility is not in use?

- The peak energy design use applies there is no adjustment factor for the portions of the year the facility is not in use. (C101.5.2)

103.1.2 Fan efficiency requirements now incorporate fan efficiency grade (FEG). Add FEG to equipment efficiency requirements in drawing schedules

- Language has been added.

Chapter 4 Commercial Energy Efficiency

Amend language in C401.3 Certificate of Compliance to include *“At the time of application for a construction permit, the designer shall include a statement on the submitted stamped drawings that the design complies with the requirements of the CBES. “*

- This language has been added. However, it will not satisfy the Act 250 9(f) requirement for providing evidence of compliance on the permit application.

Table C402.1 recommend that the value be 34 not 35. 34 is 6" (two 3" sheets) of polyisocyanurate, 35 would require different thickness sheets or a likely jump to 7" or 8" thickness.

- 2015 Base CBES will include envelope values from IECC or previous 2011 CBES (if more stringent). Comment is therefore non-applicable.

Table C402.1 Building Envelope Requirements – Opaque Assemblies and Elements – Though the IECC does not contain different requirements for semi-conditioned buildings, Standard 90.1 does. Recommend adding the Standard 90.1 requirements.

- The IECC does not contain semi-heated requirements because it would leave the door open for the construction of a “semi-heated” building and then additional heating and cooling being incorporated at a later date without updating the building envelope. The voters at the IECC thought this could be a problem, ASHRAE does not.
- Users of the 2015 VT CBES can comply with ASHRAE 90.1-2013 if desired.

Table C402.1 Building Envelope Requirements – Opaque Assemblies and Elements – What is the reason for increasing the joist/framing-metal insulation requirement from R-30 -> R-38?

- The IECC actually only has one category, “Joist/Framing,” whereas CBES has two categories (same as 90.1), Joist/Framing-Metal and Joist/Framing-Wood and Other. The footnote (f) in the 2015 IECC (and previous versions) states: “Steel Floor Joist systems shall be insulated to R-38.” So the two codes are the same, however CBES is explicitly stating the same requirement rather than putting it in a footnote.

Table C402.3 – Reduce slab edge requirement for unheated slabs to R-10 and reduce air leakage to 0.40 cfm/SF for better efficiency and easier detailing for most buildings.

- Current R-15 is for Group R only and is same as was included in 2011 CBES, and will remain same in 2015 CBES. Stretch code reduces air leakage to 0.40 CFM/SF.

402.5.7 The draft text for thermostats states: ‘2. *Tamper proof* **and** 3. *Inaccessible location*’. Change draft text to: ‘2. *Tamper proof* **or** 3. *Inaccessible locations*.’

- The language has been revised.

Simple HVAC systems (as noted in ASHRAE 90.1-2013) have been omitted. Suggest the inclusion of simple HVAC system text from 90.1-2013.

- Assume the comment refers to section 6.3 in 90.1-2013. If so, there is too much risk in trying to direct users to all the necessary correct sub-sections with section C403.

C403.1.2 Note electric snow melt grids are prohibited.

- Language added.

Tables C403.2.3 – No requirements are included for variable refrigerant flow heat pumps. Standard 90.1 has included these requirements for the last two versions (2010 and 2013); recommend adding.

- Tables have been added per ASHRAE.

Table C.403.2.3(7) Water Chilling Packages – Efficiency Requirements – “Air-cooled chillers” size category should be “< 150 Tons”, not “< 159 Tons”

- This has been corrected.

Table C403.2.3(10) Heat Transfer Equipment – Is it valuable to include this, given that there is no efficiency requirement, only a test procedure requirement?

- Table and references have been removed

Recommend modifying section C403.2.4.1.1 to allow supplementary electric resistance heating for air source variable refrigerant flow (VRF) systems.

- Exception language has been inserted.

C403.2.4.1.1 Supplemental resistance heat during heating defrost mode is necessary to avoid sub cooling of space when defrost mode is active. Suggest the following language: Heat pumps having supplementary electric resistance heat shall have controls that, except during defrost, prevent supplementary heat operation where the heat pump can provide the heating load.

- Revised language to *'Heat pumps having supplementary electric resistance heat are prohibited, except for use during defrost. Heat pumps having supplementary electric resistance heat shall have controls that, except during defrost, prevent supplementary heat operation.'*

C403.2.4.2.3 Automatic start capabilities- Is this possible, or is equipment available for simple systems (ex. ones with wall thermostat)?

- Section removed.

C403.2.4.5.1 Snow- and ice-melt system supplemental energy – The wording is confusing and seems too stringent. It may be more valuable to require that these systems have functional testing.

- Another comment supported this, and added that the electric system reference here seems to conflict with the prohibition on electric resistance heating in the code. The section has been removed.

C403.2.4.7 Economizer fault detection and diagnostics – Is this possible, or is equipment available for simple systems (ex. ones with wall thermostat)?

- Economizer FDD requirement revised to only apply to systems greater than or equal to 20 tons (240,000 Btu/h).

C403.2.4.5.1 Change ventilation reference to simply ASHRAE Ventilation Standard 62. With the version year omitted due to continual update process of the standard.

- Language revised.

C403.2.7 Mandates exhaust air energy recovery for systems based on supply air capacity and percent outdoor air. The economic basis is unclear for systems with low fractions of outdoor air. Suggest omitting energy recovery requirements for systems with <20% outdoor air.

- This change has been made.

C403.2.9 Roof-top unit, duct and plenum insulation and sealing – Regarding rooftop unit insulation, it seems like only one manufacturer offers products that would meet this. All others have insulation ranging from R-1 to R-7. Recommend investigating and possibly removing requirement if equipment is not available that meets it.

- Checked with manufacturer reps and received conflicting accounts for the availability of RTU wall insulation. Leaving this requirement out until further information is available for future code update.

C403.2.9 Roof-top unit, duct and plenum insulation and sealing – Recommend adding buried duct insulation requirement, similar to that identified in Standard 90.1-2013 Table 5.8.2B.

- Language added for minimum of R-3.5 for buried ducts.

C403.2.9 Retain R12 exterior duct insulation.

- Language retained.

C403.2.12.3 Fan efficiency. - Are manufacturers currently publishing this data, and will it will be available to designers at the time of the code adoption?

- Refer to http://www.amca.org/userfiles/file/nospreads_fanefficgrades.pdf

C403.2.13 Heating outside a building. – What does the exception for electric resistance heating systems heated with a renewable fuel source mean? Recommend removing this exception.

- Exception removed.

C403.3 Economizers (Prescriptive) – The insertion “≥ 54,000 Btu/h” is not required, as it is stated in Exception 1.

- Correction made.

C403.3 Economizers (Prescriptive) – The insertion “excluding heat pumps” in exception 1.2 is not necessary as heat pumps have direct expansion cooling coils, which is covered in exception 1.1.

- Correction made.

C403.3 Economizers (Prescriptive) – Exception 7 references Section C403.4.7, which doesn’t exist. Should it be C403.4.5 instead?

- Corrected (IECC error)

C403.3.1 Integrated economizer control –Recommend keeping exception of equipment < 54,000 Btu/h. Even 120,000 Btu/h equipment doesn’t have this option available.

- Exception inserted.

C403.3.1 *“The total supply capacity of all fan-cooling units, excluding heat pumps, not provided with economizers shall not exceed 20 percent of the total supply capacity of all fan-cooling units in the building or 300,000 Btu/h (88 kW), whichever is greater.”* Suggest exception text from 90.1-2013 and, Table 6.5.1-3. *“For comfort cooling where the cooling efficiency meets or exceeds the efficiency improvement in Table 6.5.1-3.”*

- Exception language added to reflect ASHRAE 90.1 requirement (rounded down to 50% for simplicity [56% for CZ6a in 90.1]): *6. Where the cooling efficiency meets or exceeds a 50% efficiency improvement in cooling equipment performance (EER or IPLV).*

C403.3.1 Suggest incorporation of the suggested exclusion text, ‘Exclusions:

“1-Direct expansion systems that include controls that reduce the quantity of outdoor air required to prevent coil frosting at the lowest step of compressor unloading, provided this lowest step is no greater than 25% of the total system capacity.

2-Individual direct expansion units that have a rated cooling capacity less than 54,000 Btu/h and use non-integrated economizer controls that preclude simultaneous operation of the economizer and mechanical cooling.”

- Language revised

C403.3.5 Supermarket refrigeration exception: Retain. If there were viable alternatives, 90.1-2013 would have addressed them.

- This has been retained.

C403.4.1.3 Set points for direct digital control – There are a couple words missing in this requirement. It should read *“...with direct digital control of individual zone boxes reporting to the central control panel...”*

- Corrected error.

C403.4.2.4.2 Threshold for VFD in proposed text is 10 HP or greater. Suggest this be revised to a 5 HP motor threshold.

- Requirement has been changed as proposed.

Piping System Design Maximum Flow Rate – Recommend adding these requirements, based on 90.1-2013 Table 6.5.4.6.

- Table adapted and inserted into 2015 CBES. (Table 403.4.2.7)

C403.4.3 Heat rejection equipment – The verbiage here should be deleted, as it is repeated in a subsection after (C403.4.3.2.1).

- Section deleted.

Delete the VT revision to limit the size of electric water heaters to 5kW and keep the requirements of the IECC as is. Or limit to 20 kW.

- Code revised to allow up to 12 kW limit. (404.1.1)

C404.8 Drain water heat recovery units – Is it valuable to include this, given that there is no efficiency requirement, only a test procedure requirement?

- Requirement was left as-is. Products must= show that they meet that certification in order to comply with the code.

C404.9.3 and C404.9.4 - It is not technically possible to comply with these as written on all project sites. It is strongly recommend adopting only the national 404.9.3 language until further study and stakeholder input is possible.

- Comment accepted. Reverting back to original IECC language and removing outdoor pool requirements (originally sourced from IgCC).

C404.9.3 Covers for outdoor pools and spas should be retained in this code.

- Language retained per additional stakeholder comments.

C404.9.4 Heated pools in conditioned spaces – It seems like this may not be reasonable.

- Comment accepted (also other stakeholder comments on this). Section removed.

Customers have asked that programmable lighting controls be replaced with toggle switches due to the experience that they never work correctly. Has there ever been a study done on a building that has lighting controls in place for several years to see if they work as intended?

- We cannot answer the question with certainty without doing a literature search/review. However, Section C405.2.1.1 (Occupant sensor control function) in the 2015 VT CBES clearly states that occupant sensor controls be manual on (or if automatic only turn on 50% of lights) and must have manual off controls. This provision is a direct attempt to address the issues the commenter raises.

C405.2.1 Classrooms K thru 12: Should be included in occupancy sensor requirements, given the low cost of occupancy sensors.

- Comment accepted. No changes made.

C405.2.3 & C405.2.3.1 Proper day-lighting is complex and proper calibration is important. However, the statements in these sections are vague and their intent is uncertain.

- Section C405.2.3.1. has been deleted. (Regarding calibrating from within the space). All other items remain, based on feedback from VT lighting expert. The dimming requirement is not out of the ordinary, and full output would be defined by the designer, but the dimmers must be capable to go down at least as low as 15%.

TABLE C405.4.2(1)& (2) Interior LPD's has increased. Retain the lower LPD values per 2011 CBES.

- The 2015 IECC has expanded LPD's to the second decimal place. Where increases in LPD values are simply due to rounding (e.g., 1.2 to 1.24), no change to the 2015 IECC values is made. Where notable increases were made, the 2011 CBES values have been maintained.

C405.5 Exterior lighting: Cut off fixture requirement is only currently suggested for Act 250 projects, all exterior lighting should require cut off fixtures.

- Language and definition added.

Additional clarity required for what would trigger the additional stretch efficiency requirements in section C406. Would this just be for new construction and rehabs or would alterations, renovations and repairs also trigger this requirement.

- Language has been added that explicitly states additions, alterations and repairs do not need to comply with C406 (additional efficiency package options) See C502.1, C503.1 and C504.1.

Solar ready roof requirement should be part of both the residential and commercial codes.

- Solar PV is an option in section C406.1 for the base code. The stretch code has the same option but with the requirement that if the PV option is not chosen then the roof needs to be designed to optimize the use of solar PV in the future if it were to be installed.

Preserve the Performance Path in Section C407. To remove C407 from the IECC would require all performance paths to run through ASHRAE 90.1, even for code users who prefer the IECC. We recommend keeping C407 as published in the 2015 IECC to maintain adequate compliance options for professionals who prefer using the IECC.

- Those wishing to use a total building performance method are directed to use ASHRAE 90.1 2013 for compliance. It is felt that currently section C407 is not suitable for use in Vermont.

C408.2 Commissioning is a process that is properly done by a representative to the owner. The commissioning agent works for the owner and provide their work product to the owner. It should be the owner's responsibility, not the design or contractor team, to confirm that commissioning has been done.

- Due to public comments, the 2015 IECC commissioning section has been deleted and the 2011 CBES commissioning language has been maintained with the addition of lighting controls functional testing added to the scope of the section.

Chapter 5 Existing Buildings

C503.2 / C505.1 Changing the space conditioning in a non-conditioned building or low-energy space or occupancy triggers full compliance with the code. What are the requirements if this happens?

- As stated in Section C5032.2, *“Any non-conditioned or low-energy space that is altered to become conditioned space shall be required to be brought into full compliance with this code.”* Moving from non-conditioned to conditioned requires **all** buildings systems to comply with the code for that space. As opposed to alterations where the following provision applies: *“Alterations to an existing building, building system or portion thereof shall conform to the provisions of this code as those provisions relate to new construction without requiring the unaltered portions of the existing building or building system to comply with this code.”*

C503.3 At what point is insulating existing walls required?

- As with the previous iterations of this code if you expose the wall cavity then you are required to bring it up to code or fill the cavity with insulation.

What provisions are there for not needing to insulate existing masonry in non-historic buildings if the addition of insulation might cause long term deterioration due to the changed moisture and thermal drive profiles?

- If you expose the wall cavity in an existing wall then you are required to bring it up to code or fill the cavity with insulation. Therefore, if the existing wall is a masonry wall and no cavities are exposed, the user can determine if additional insulation is desired or not.

Stretch code

Requiring electric vehicle charging for 4% of all new parking spots is cost prohibitive for large scale projects. Large parking lot projects should have a sliding scale approach. Greater than 500 spaces 1% and as the number of spaces increases the required percentage drops.

[Note: Applies to stretch code only] Language was changed to specify that 4% applies for buildings with up to 500 parking spaces. A minimum of 20 spaces with Level 1 charging is required for sites with more than 500 parking spaces.