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CPI SFC Comments re 2016 Residential ACM

Additional submitted attachment is included below.

American Chemistry Council | Center for the Polyurethanes Industry

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California Energy Commission
Dockets Office, MS-4
1516 Ninth Street
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RE: Docket #15-BSTD-04
2016 Draft Residential Alternative Compliance Method Manual

Dear California Energy Commission,

Over the past year the Spray Foam Coalition[1] (SFC) of the Center for the Polyurethanes Industry has been working to ensure that California Building Energy Code Compliance (CBECC) software provides energy savings estimates for Unvented Attics (UVAs) that are consistent with field data and based on sound assumptions. Through this process we have gained insight into the algorithms used to approximate the compliance impact of UVAs and other efficiency measures. Based on this experience and after a review of the Draft 2016 Alternative Calculation Method (ACM) Manual, we noticed that several of the descriptions in the draft language are not consistent with actual construction practice or CBECC's current functionality with respect to modeling unvented attics.

We are writing to draw attention to these inconsistencies and inaccuracies in the ACM Manual to ensure that current and future versions of the compliance software are aligned with the assumptions and algorithms described in the manual. The following issues have been identified on page 67 of the draft ACM Manual. Text from the manual is shown in black print; our responses and concerns are provided in blue.

2.6.4 Attic Conditioning

Attics may be ventilated ~~(typical)~~ or unventilated. Insulation in a ventilated attic is usually at the ceiling level but could also be located at the roof deck. ~~and for an u~~Unventilated attics usually have insulation located at the roof deck ~~may be~~ and ~~at~~ the ceiling ~~or roof level~~ (§150.0(a)).

[1] The Spray Foam Coalition (SFC) champions the use of spray polyurethane foam in U.S. building and construction applications and promotes its economic, environmental and societal benefits while supporting the safe manufacture, transport, and application of spray polyurethane foam. SFC consists of manufacturers of spray polyurethane foam systems as well as suppliers of raw materials and machinery used to apply the foam.

The second sentence of the paragraph above indicates that UVAs "usually have insulation located at the roof deck ***and the ceiling***." This is inaccurate. A typical UVA design removes ceiling insulation and only insulates the roof deck and gable ends, bringing the attic into the conditioned building enclosure, as indicated by the following sentence:

In an unventilated ~~(conditioned)~~ attic, the roof system becomes part of the insulated building enclosure. Local building jurisdictions may impose additional requirements.

PROPOSED DESIGN

When spray foam insulation is applied to a roof that will not be vented, it is modeled as a "conditioned" attic and the volume of the attic is included in the conditioned space. A conventional attic is assumed to be "ventilated."

The above paragraph indicates that a spray polyurethane foam (SPF) UVA is modeled as "conditioned," whereas the software only allows the user to choose between "ventilated" and "unventilated." The air-sealing benefits of SPF distinguish an SPF UVA from a UVA constructed with air-permeable insulation, which may be what is meant by "conditioned" (i.e., sealed) versus "unventilated." However, this distinction needs to be clarified, as well as any changes to modeling assumptions that would accompany this distinction.

STANDARD DESIGN

Attic ventilation is not a compliance variable and is the same for both proposed and standard design.

The sentence above seems to indicate that the energy modelling software does not differentiate between homes with attic ventilation and those without (UVAs) – i.e., meaning that the selection of "unventilated" versus "ventilated" does not impact the compliance margin. There is a considerable energy performance difference between these two different designs as observed in the field, and the most recent version of CBECC *does* provide some additional credit when the user toggles from vented to unvented attic, so this sentence in the ACM manual appears to be in error. Please correct the text of the ACM manual to be consistent with the functionality of the software.

VERIFICATION AND REPORTING

The attic conditioning (ventilated, unventilated, or conditioned) is reported on the CF1R.

The above sentence indicates that there are three different types of attics that can be modeled in the 2013 version of CBECC, but the current interface only allows the user to choose between ventilated and unventilated. If there are plans to update the 2016 software to include "conditioned" attics as well, we would like to understand what definition would be used for "conditioned" and how it would be differentiated from "unventilated."

Defining Air Net Leakage

In addition to this above comments on section 2.6.4 above, we have the following concerns regarding the infiltration/envelope leakage assumptions in section 2.2.5.2 "Defining Air Net Leakage":

The table below indicates that either 40% or 50% of a home's leaks occur at the ceiling plane. We understand that this is based on field data collected from homes with vented attics and do not question the validity of that assumption for vented attic configurations. We also understand that the 50% leakage assumption is maintained for homes constructed with an SPF UVA, although the 50% leakage assumption is applied to the roof deck instead of the ceiling plane. However, in reality, homes constructed with an SPF UVA will have very little leakage through the roof deck – in both an absolute sense and as a percentage of total envelope leakage.

Table 2-3: Air Leakage Distribution

	% of Total Leakage by Surface			
Configuration	**Ceilings**	**Floors**	**Exterior Walls**	**House to Garage Surfaces**
Slab on grade	50	0		
Raised Floor	40	10		
No Garage			50	0
Attached Garage			40	10

Given the ability of SPF UVAs to limit stack effect by creating a tight "lid" on the home, as well as directly limiting infiltration of unconditioned air into the attic, it seems appropriate to adjust Table 2-3 assumptions for homes with SPF UVAs. We would be happy to work with staff to provide field data and/or engineering analyses to identify the appropriate relative and absolute air infiltration assumptions for use in modeling SPF UVAs.

We look forward to addressing these topics with CEC staff. In the interim, please do not hesitate to contact me at Justin_Koscher@americanchemistry.com, (202) 241-6617, or Rick Duncan, rickduncan@sprayfoam.org, (410) 920-9920, with any questions.

Kind regards,

Justin Koscher, Director
Center for the Polyurethanes Industry
Spray Foam Coalition