

**Docket number 12-BSTD-01****Comments to the California Energy Commission by Mike Gabel  
on the 2013 Residential and Nonresidential ACM Manuals**

Please review the following comments as they pertain to the 2013 Residential and Nonresidential ACM Approval and Technical Manuals. Given the major changeover from one ACM Manual to a *2013 ACM Approval Manual* and a *2013 ACM Technical Manual*, and given the new role of the *Compliance Manager* in all approved compliance software, I'm making these remarks without knowing exactly how and where they need to be incorporated. I'm requesting that Staff review and implement these recommendations in the most effective fashion within all relevant 2013 Standards documents and software.

To the extent that these comments affect the 2013 ACM Approval Manuals, please specify whatever is needed in those documents to allow for the following suggestions.

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**1. *Printout of Standard Design Energy Measures***

Every compliance software program must be required to:

- (a) Show an on-screen listing of all energy measures that define the Standard Design; and,
- (b) Print out a new [optional] compliance form (e.g., SD-1) that lists all Standard Design energy measures

It's crucial that anyone who reviews compliance forms for a specific Proposed Design can see, in a fair amount of detail, how the baseline Standard Design is set for that particular project. It would also substantially help in debugging the development of the Standard Design energy budget in the Compliance Manager. Currently, this capability is lacking under the 2008 Standards.

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**2. *Input of Relevant Notes into Compliance Software***

There are many fields, especially in the Nonresidential compliance forms, which are printed as blank because the compliance software will not allow for inputs to those to be printed within the program. Compliance software should be required to allow certain Notes and/or text to appear on the forms for certain defined fields that don't affect the energy use of the building.

As a corollary, compliance forms to be sent to a Registry database should allow editing in those areas of the forms which allow for Remarks or Notes but do not change the list of necessary energy measures or the energy use metrics.

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### ***3. Existing Shading of Replacement Fenestration***

An unfortunate -- and unfair -- aspect to current performance modeling rules is that new fenestration in a proposed building is compared to Standard Design fenestration with no exterior shading; but replacement windows in a proposed building are compared to Standard Design windows that already include all existing fixed exterior shading modeled (i.e., overhangs and side-fins). The 2013 standards should get rid of this anomaly. Any exterior shading – new, existing or altered – should always be treated the same way in the Standard Design with respect to any glazing connected to it. It makes no sense to credit exterior shades only for new fenestration, and then not give shading proper credit in keeping out solar gain for replacement windows. This should be true whether considering Residential or Nonresidential buildings.

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### ***4. All Inputs that Affect TDV Energy on the Certificate of Compliance***

There are a number of inputs into 2008 compliance software that affect the TDV energy of the Proposed and/or Standard building; but show up nowhere in the Certificate of Compliance. The 2013 Standards should require that any energy measure inputs that affect TDV energy use must appear within the Certificate of Compliance.

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### ***5. Consistent and Correct Default Values in Standard Design Mechanical Systems***

I'm not sure whether it is the logic defined (or left undefined) within the 2008 ACM Manuals, or whether some of these are Energy Pro and/or Micropas problems. However, Standard Design TDV energy use -- apparently related to the default assumptions regarding the Standard Design HVAC systems – sometimes depends on how the Proposed building HVAC system is defined or left undefined. If, for example, the compliance software user specifies that a nonresidential HVAC system is Existing and not part of the compliance calculations, then the software should always model the Standard Design HVAC system the same way – regardless of whether one puts in an actual (Existing) system or leaves the Existing system “undefined”. The ACM Manuals should be clear enough that these sorts of problems don't arise under the 2013 Standards.

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## **6. 2013 Nonresidential Daylit Zones Noted on Compliance Forms**

Even though automatic lighting controls are mandatory for nonresidential primary side-lit daylight zones, not including these daylight zones and the fixtures in them will affect the performance analysis. Nonresidential compliance software should be required to test if there is a daylight zone based on the 2013 definition (fenestration  $\geq$  24 sf with requisite VT), and print out something on the Certificate of Compliance making a point that “no daylight zone has been input”, and/or that “no lighting fixtures have been assigned to the daylight zone”, etc.

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## **7. Fully Defining Existing vs. Altered Conditions in Residential Compliance Software**

Under the Residential Standards: being able to fully define Existing vs. Altered vs. New conditions for all building and system inputs is very important to assign proper credits and penalties to pre- and post-alteration conditions. Current versions of Energy Pro and Micropas don't always allow one to fully define and compare Existing conditions to Altered conditions when certain HVAC system types change. ACMs should always allow for a full and detailed description of HVAC and water heating systems before and after a remodel, and be able to fully model before and after conditions accurately.

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## **Docket number 12-BSTD-01**

### **Comments to the California Energy Commission by Mike Gabel on the 45-Day Language of the 2013 Standards**

Please review the following comments on the 2013 Standards 45-Day language which are listed in the order that the relevant sections appear. If minor changes in wording are recommended, existing language is included with red underlined changes shown.

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#### **Section 10-103(a)1.A**

This section needs a clear and well written explanation in the *Nonresidential Compliance Manual*. What is the Design Review Kickoff Certificate of Compliance? Will the building department ever see it? Is it only a part of design review for a local planning department? And does mean that nonresidential buildings will always require a preliminary Title 24 Part 6 analysis (prior to permit) and then a final analysis for permit? There are many aspects to this which are very unclear based on the language here in the standards.

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#### **Section 10-103(a)1.C and 2.A**

These are important changes that need to be explained and highlighted in the Residential Compliance Manual. The language in 10-103(a)2.A means that a building department cannot require permit documentation be approved before issuing a permit (“.. *is not required* ..”) for these types of alterations. That is, they can’t hold up the permit while they review Title 24 documentation. Building departments need to know this.

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#### **Section 10-111(b)2.B**

I think you want to say **Visible** (not “Visual”) Transmittance for consistency with definitions of VT throughout the standards.

**General Comment: Use either “Visible Transmittance” or “Visual Transmittance” consistently throughout the Standards and all related CEC documents.**

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#### **Section 100.1 - DEFINITIONS**

Under FENESTRATION, there is a problem with the current language and the language in Section 150.2(b)1.B on Replacement Fenestration.

**ALTERATION** is any change to an existing building's exterior fenestration or glazed door component that is not a repair (see *Fenestration Repair*) and requires a permit and:

*A. Replaces an existing fenestration or existing glazing with no area added is considered an alteration and is subject to the Alteration Section in Part 6; or*

*B. Replaces the existing fenestration or existing glazing and adds new area in which increases or decreases the overall rough opening of the window frame. It is considered an alteration and is subject to the Alteration Section in Part 6.*

### ***New Added Window***

*A. When new fenestration area is added to an existing or new exterior opaque surface or door it is not considered an alteration and is subject to the maximum window wall ration in Part 6.*

And then consider the language in Section 150.2(b)1.B:

***B. Replacement Fenestration:*** *Replacement of vertical fenestration and skylights, where existing glazing fenestration is replaced with a new manufactured fenestration product in the same orientation, and tilt and unaltered rough opening, shall meet the U-factor and Solar Heat Gain Coefficient requirements of Package D Sections 150.1(c)3A, and 150.1(c)4, and TABLE 151-C) Package A TABLE 150.1-A.*

As currently proposed, this combination of language makes it extremely difficult for compliance and enforcement. What the 2008 Standards attempted to do was to count only a net fenestration area change in the same existing surface (wall or roof) to decide whether glazing being put in counted as an “alteration” or as “new”. As a practical matter, it is often impossible to track and calculate glazing being placed in an existing, unchanged opening vs. openings which are being removed, reshaped or added. This is true for the energy analyst, the HERS Rater (who, under the 2013 standards, may have to inspect existing vs. altered conditions) and the plan checker. I would propose language in the two referenced sections to solve this problem. First, new language for Section 100.1:

***ALTERATION*** *is any change to an existing building's exterior fenestration or glazed door component that is not a repair (see Fenestration Repair) and requires a permit and:*

*A. Replaces existing fenestration with no net area added is considered an alteration and is subject to the Alteration Section in Part 6; or*

*B. Replaces existing fenestration and adds new net area in the existing wall or roof; and is considered an alteration and is subject to the Alteration Section in Part 6.*

### ***New Added Window***

*A. When new net fenestration area is added to an existing wall or roof, it is not considered an alteration and is subject to the maximum Window Wall Ratio in Part 6.*

With new proposed language for Section 150.2(b)1.B:

***B. Replacement Fenestration:.*** *Replacement of vertical fenestration and skylights, where existing fenestration area in an existing wall or roof is replaced with a new manufactured fenestration product up to the total fenestration area removed in that existing wall or roof, shall meet the U-factor and Solar Heat Gain Coefficient requirements of Package D Sections 150.1(c)3A, and 150.1(c)4, and TABLE 151-C) Package A TABLE 150.1-A.*

The intent of requirement new fenestration requirements for any increase in glazing area is maintained. However, the above is far simpler and easier to manage for the individuals involved doing and verifying all the calculations. To put it another way: Not doing this will create a nightmare in trying to fully and accurately analyze a large percentage of alterations which include window replacements and other changes in fenestration design.

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### **Section 100.1 - DEFINITIONS**

Under FENESTRATION, the Standards need a definition of FENESTRATION AREA for several reasons:

- (1) FENESTRATION PRODUCT omits glazing areas in doors with less than 50% glass, but that glass still needs to be included and modeled in calculations.
- (2) The standards should make it clear that all glazing areas need to be included, whether or not they represent a Fenestration Product.
- (3) Fenestration area should remain as either the rough opening, nominal opening or sash opening.

So I would make the definition simply:

***FENESTRATION AREA is the area of any transparent or translucent material plus any sash, frame, mullions and dividers, in the envelope of a building, including, but not limited to, windows, sliding glass doors, French doors, skylights, curtain walls, garden windows and glass block.***

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### **Section 100.1**

Under LIGHTING definitions, I think you want “**SCONCE**” to read “**Sconce**”.

Under PROPOSED DESIGN BUILDING ENERGY USE, I would make “ .. *predicted energy use of proposed building*” read “ .. *the predicted TDV energy use of the proposed building*”

I still advocate having a definition for SOLAR ACCESS, and that Solar Ready requirements in Section 110.10 be waived if a building does not have Solar Access.

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### **Section 110.2**

This section should make clear, at the outset, that federal appliance standards dictate minimum state efficiency requirements for federally listed appliances. And there should be a reference to a document or set of documents or agency that specifies what the federal appliance standards are (including effective dates of higher efficiencies of appliances covered in Title 24 Part 6.)

To the uninitiated, it's very confusing to not see a reference to the federal appliance standards when, in fact, they pre-empt state standards for several classes of appliances. Furthermore, it would help implementation of the Building Energy Efficiency Standards if the CEC would make available on its web site (as a URL site to download or a PDF document) a summary of federal appliance standards as of 1/1/14 when the 2013 Standards take effect.

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### **Section 110.6(a)2.**

In EXCEPTION 2 to Section 110.6(a)2: Is the intent to allow any area of replacement fenestration to use the NA6 procedures such as Center-of-Glass (COG) procedures? Also, why does this apply to “ .. *an alteration consisting only of replacement glass ..*”?

To follow the intent of what I understood to be the consensus position with Staff on this policy, the Exception should be worded as follows:

**EXCEPTION 2 to Section 110.6(a)2:** *If the fenestration product is an alteration consisting **only of any area of** replacement glass in a building covered by the nonresidential standards, the default U-factor may be calculated as set forth in Reference Nonresidential Appendix NA6.*

The same comments apply to SHGC, and EXCEPTION 2 to Section 110.6(a)3 should therefore read:

**EXCEPTION 2 to Section 110.6(a)3:** *If the fenestration product is an alteration consisting **only of any area of** replacement glass in a building covered by the nonresidential standards, the default SHGC may be calculated as set forth in Reference Nonresidential Appendix NA6.*

.. and ..

**EXCEPTION 2 to Section 116(a)4:** *If the fenestration product is an alteration consisting only of any area of replacement glass in a skylight or in a vertical site-built fenestration product, in a building covered by the nonresidential standards, the default VT may be calculated using Reference Nonresidential Appendix NA6.*

NA6 talks about the 1,000 sf limit to using the COG method for new glass, but it should be made clear that the 1,000 sf limit does not apply to replacement glass.

**General Comment (again):** *VT should be either “visual transmittance” or “visible transmittance” throughout all standards documents.*

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### **Section 110.10**

Again: Although I don't have magic wording for a “SOLAR ACCESS” definition in 100.1, that sort of definition would help Section 110.10 so that some buildings could be exempted from the solar ready requirements.

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### **Section 120.7(b)2.**

The mandatory metal frame wall  $U=0.098$  assumes continuous rigid insulation. The problem is that for high-rise buildings (4+ stories), because of fire code issues, I hear that there is only one generally available and reputable product that creates a continuous exterior insulation of an inch or more; and that the product adds an incremental cost to the wall assembly of \$6 to \$8 per square foot. In almost all the climate zone studies we did in support 2008 Stds local reach codes approved by the CEC, that incremental cost is not cost-effective in most climate zones.

My strong recommendation is to back off this value for the 2013 standards, and have AEC do some serious research for the 2016 standards on cost effectiveness of adding continuous insulation on metal frame walls per climate zone. For 15-day language, go back to the U-factor for R-13 cavity in metal frame walls 16”o.c. = 0.217. Or make an Exception to the 45-day language U-factor for high-rise residential and nonresidential buildings which would have to meet only the 0.217 U-factor.

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### **Section 130.1(b)**

EXCEPTION 1 to Section 130.1(b): should read “ .. *general lighting load of 0.7 watts per square foot and less ..*” ..

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### **Section 140.3(a)8. Relocatable Public School Buildings, in Table 140.3-D**

Under Relative Solar Heat Gain: get rid of % WWR! That parameter has been deleted in the other Envelope tables, and it should be deleted here as well. Simply set the RSHG = **0.26** for all WWR percentages.

Under Glazed Doors: “*Max Average VT*” should read “*Min Average Weighted VT*” .

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### **Section 141.0(b)1.A.i**

Please make note in the *Nonresidential ACM Technical Manual* that the Standard Design Altered fenestration is always un-shaded, just as it is for new construction. If an existing building contains shaded glazing, those existing external shades should receive the same energy credit as they would if the building were new.

### **Under Exception 1**

The language should read “*3. 50 square feet or less of skylight is added.*”

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### **Exception to Section 150.0(c)2.**

I suggest the language read: *EXCEPTION to Section 150(c)1 and 2: Existing walls already insulated with R-11 or already having a U-factor of 0.110 or less, and achieving compliance with those existing walls R-11 using a performance compliance method, are exempt from meeting the requirements of 150(c)1 & 2.*

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**EXCEPTION to Section 150.0(q)1:** *Up to 10 square feet of fenestration area or 0.5% of the Conditioned Floor Area whichever is greater is exempt from the maximum U-factor.*

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### **TABLE 150.0-B**

Should read: *Use this table to determine luminaire efficacy only for lighting systems not listed in Table 150.0-GA.*

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### **TABLE 151.0-A**

Under Floors, “*Slab perimeter*” should read “**Unheated Slab Perimeter**” to make clear that Heated Slabs have a different slab insulation requirement per Table 110.8-B.

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### **Section 150.2(b)1.B**

As explained in earlier comments, this should read:

**B. Replacement Fenestration:.** Replacement of vertical fenestration and skylights, where existing fenestration area in an existing wall or roof is replaced with a new manufactured fenestration product up to the total fenestration area removed in that existing wall or roof, shall meet the U-factor and Solar Heat Gain Coefficient requirements of Package D Sections 150.1(c)3A, and 150.1(c)4, and TABLE 151-C) Package A TABLE 150.1-A.

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