

## Energy - Docket Optical System

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**From:** Ware, David@Energy  
**Sent:** Friday, January 11, 2013 2:16 PM  
**To:** Thomas Hutchinson (hutch@hutchinsondesigngroup.com)  
**Cc:** Bozorgchami, Payam@Energy; Energy - Docket Optical System  
**Subject:** Docket 12-BTSD-07: Compliance Option for Low-Sloped Roofs the Use Aggregate

January 11, 2013

Thomas W. Hutchinson  
Hutchinson Design Group, Ltd.  
232 E. Main Street  
Barrington, IL 60010



RE: DOCKET 12-BTSD-07

Dear Mr. Hutchinson:

This email follows-up our telephone conversation yesterday regarding your letter of December 28, 2012 submitted to the docket noted above. You have suggested that the eligibility criteria for this proposed compliance option for aggregate material used as surfacing for low-sloped roofs be wider in scope to incorporate larger stone material as well. In particular, stone/aggregate typically used for ballasted roofs. In addition, you suggest that within the listed eligibility criteria that "a coverage weight of 10#/SF" be allowed. It is not clear whether your suggestion for allowing a mass weight of roofing material is a condition for allowing larger stone/aggregate ("No. "2" sieve and is retained by a No. 8 sieve), or is an alternative to meeting the proposed tested initial solar reflectance for aggregate material of 0.55. For the issue of roof surfacing coverage weight, your letter mentions research conducted by ORNL and SPRI, and other information and research provided to the Energy Commission by the EPDM Roofing Association (note: none of which were enclosed with your letter submitted for this activity).

Nevertheless, our telephone conversation centered on two primary items in order for staff to take further action regarding your recommendations.

1. **In-Situ Testing:** This compliance option's proposed default aged solar reflectance is supported by on-site reflectance testing conducted by LBNL. The aggregate tested was within a particular size, typical of BUR roofing systems, and as such the eligibility criteria included a reference to ASTM D1863. We're not aware of research that shows that the solar reflectance of larger stone/aggregate used for ballasted roofs (1 ½" – 2 ½"), with similar color, would have the same or similar solar reflectance.

Note that a critical element of this proposed compliance option for a default aged solar reflectance is that the aggregate must, FIRST, have "a CRRC-tested initial solar reflectance that meets or exceeds 0.55 using the ASTM1918 test procedure..." In other words, larger stone/aggregate, such as used for ballasted roofs, would have to have testing results showing that it has an initial solar reflectance of 0.55. If that can be met, what is still needed is corroboration that larger stone/aggregate typical of ballasted roofs would have an aged solar reflectance equal or similar to what was found by the LBNL site testing for smaller aggregate material. Staff will be discussing this issue with LBNL in the next week or so, but the industry group you represent should be aware of the possible need to provide the results of on-site testing for solar reflectance. It would be most useful if this testing was conducted in a similar situation and on building conditions consistent with the testing prepared for aggregate materials.

2. **Material Weight:** Staff's proposed compliance option does not include roof surfacing weight as a criteria for use of the default aged solar reflectance value. As noted above, the only criteria we've suggested is that aggregate have a tested initial solar reflectance of 0.55. Your letter alludes to a study by ORNL conducted in

2004 that studied the thermal and energy use benefits of ballasted roofs compared to other roof systems, some having relative high solar reflectance. You also mention other information submitted to the CEC regarding this issue. To this end, I assume you're referring to your letter dated March, 4, 2011. This letter, and its included analysis purports to show the additional insulation R-value needed to achieve equal energy savings to roofs with a higher solar reflectance; and includes information that the value of varying roof weight from 10 – 25 psf. has little impact on energy savings. The latter discussion regarding roof weight is somewhat unclear.

The current standards, and the adopted 2013 standards, allow a roof having a weight of 25 psf. or more to be equivalent to the prescribed minimum aged solar reflectance, 0.55 and 0.63 respectively. The thermal mass of roofs can always be used to help offset the required climate zone specific energy budget using the performance compliance approach. Your suggested weight of 10 psf. is not clearly supported by either the ORNL study or within the analysis of your March 4, 2011 letter. In addition, 10 psf. is the minimum roof weight allowed by the California Building Code for ballasted roofs; hence, there seems to be no intrinsic thermal benefit to be gained by meeting minimally required building practice. The proposed compliance option focuses solely on solar reflectance as an issue for aggregate roofing surfaces because of the difficulties associated with testing these materials for their aged values based on CRRC procedures. We can discuss the issue of roof weight further but I believe issues addressed in #1 above regarding verification of the solar reflectance for ballasted roof systems of existing buildings should be considered first.

Going forward, what may be most beneficial to your industry's interests is the development of a "fact sheet" for the 2013 standards that describes the equivalent energy tradeoff allowed for varying roof types based on weight. For example, roof weights could vary from 25 psf. (equivalent to a wood framed roof having a roofing surface with an aged solar reflectance of 0.63), then 17 psf., 10 psf., and 5 psf. For each segmentation, the equivalent insulation R-value could be displayed, or combination of R-value and reduced aged solar reflectance. The advantage of a fact sheet format is that it can be distributed through multiple channels: by your industry to the industry's own customers, to specifiers and designers, and by the CEC to building departments and others.

I appreciate your comments and suggestions and trust we can work quickly towards a resolution.

Sincerely,

David W. Ware  
California Energy Commission  
1516 Ninth Street, MS 37  
Sacramento, CA 95814  
916-654-4168  
david.ware@energy.ca.gov