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DOCKET	
10-BSTD-01	
DATE	FEB 2 2012
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February 2, 2012

California Energy Commission
Dockets Office
1516 Ninth Street
Sacramento, CA 95814-5512

Attention: Mr. Maziar Shirakh, Project Manager
Building Energy and Efficiency Standards California Energy Commission

Re: Docket No. 10-BSTD-01

Dear Mr. Shirakh,

It is our understanding that the CEC has proposed to change some of the prescriptive requirements for the 2013 code, including reducing the aged thermal emittance requirement from 0.85 to 0.75, and changing the aged thermal reflectivity requirement for new buildings to 0.65.

We genuinely appreciate the CEC's solicitation of input from industry stakeholders, and your willingness to consider changes to the program. Although a further step in the right direction, we still believe that these changes will result in significant market disruption.

As noted in previous letters[1] (see attached copies) our company has submitted regarding the 2013 code, we believe that any changes to the prescriptive requirements should be done in a phased manner with an increase from an aged thermal reflectivity requirement from 0.55 to 0.60 in 2013, and an additional, subsequent increase in 2017. This would allow the roofing industry the opportunity to adapt their products without risking other performance parameters, most notably, product life expectancy.

Regardless of the prescriptive values ultimately agreed upon, we urge the CEC to adopt the same values for both new construction and alterations. Based on the current values being considered, the 0.63 reflectivity and 0.75 emittance requirements should be applicable to both new and alterations. There is no practical difference in energy savings between the 0.63 being considered for alterations and the 0.65 being proposed for new construction, and the confusion that will result in the marketplace from the different values cannot be justified. Similarly, the proposed insulation trade off should be equally applicable in new and in alterations. Simplicity and uniformity will go a long way to helping achieve compliance in the field.

[1] July 7, 2011, August 15, 2011 and October 12, 2011

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We trust that the prescriptive requirements will allow for materials that meet both the reflectivity and emittance requirements, or the equivalent SRI. We would appreciate receiving confirmation or clarification on this matter.

Thank you for this opportunity to comment on the proposed change. Please do not hesitate to contact the undersigned should you have any questions.

Best regards
Sika Sarnafil
A Division of Sika Corporation

S.P. Graveline
Vice President Technical Services

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October 12, 2011, 2011

California Energy Commission
Dockets Office
1516 Ninth Street
Sacramento, CA 95814-5512

Attention: Mr. Maziar Shirakh, Project Manager
Building Energy and Efficiency Standards California Energy Commission

Re: Docket No. 10-BSTD-01

Dear Mr. Shirakh,

We are writing to you to comment on the most recent proposals to change the prescriptive insulation and aged reflectivity requirements within Title 24.

We appreciate that the CEC has given some consideration to the input of a variety of stakeholders during the July workshop. The CEC's proposed reduction of the prescriptive minimum reflectivity requirements from 0.70 to 0.67 (new construction) and 0.63 (alterations), and a reduction in the amounts of insulation required to compensate for roofs with lower reflectivity values, for the 2013 version of the code are a step in the right direction. However, there remain numerous fundamental problems with the current proposals.

No evidence or justification has been presented for the use of different prescriptive values for new construction and alterations. This two tiered approach will no doubt lead to significant confusion in the market place.

The newly proposed incremental insulation values for roofs with lower aged reflectivity values appear reasonable and justifiable. The proposed trade-off approach is simple and easily understood. The same trade-off should be allowed in new construction. We appreciate that the CEC has committed to developing a simplified, full envelope TDV calculator. However calculators have an inherent "black box" nature to them, and are generally not understood, and often misused, by construction practitioners. The CEC should strive for simplicity and transparency and allow the trade-off approach to be used as a prescriptive alternative in new construction.

Most importantly, although the CEC has committed on a number of occasions to providing economic data supporting their proposals, to date no relevant conclusive information has been

provided. No qualitative data supporting the changes proposed has been presented, thereby calling into question the need and justification for them.

In advance of the July meeting, the Center for Environmental Innovation in Roofing (CEIR) presented data[1],[2] demonstrating the minimal, insignificant impact of an increase from a minimum prescriptive aged reflectivity requirement from 0.55 to 0.70.

Building on this information (the same assumptions, parameters, etc.), the following summarizes the net potential energy cost savings that could theoretically be achieved with the most recently proposed prescriptive aged reflectivity requirements (0.63 for alterations and 0.67 for new construction).

TABLE 1: Net Electricity Savings (Annual $/ ft2) relative to a traditional black roof

	San Francisco		Los Angeles		Sacramento	
	R13.3	R20	R13.3	R20	R13.3	R20
0.55	0.004	0.003	0.027	0.017	0.052	0.033
0.60	0.005	0.003	0.032	0.019	0.057	0.036
0.63	0.005	0.003	0.032	0.020	0.061	0.038
0.67	0.005	0.003	0.034	0.022	0.065	0.041

As can be seen, based on the DOE Cool Roof Calculator (Version 1.2), the potential savings range from none to less than a penny a square foot annually at the most (Sacramento, R20). Considering the variability inherent to the numerous assumptions built into the model and the data, the results generated through the use of the DOE calculator appear to indicate that there really is no real incremental increase in energy savings to be achieved by increasing the prescriptive aged reflectivity from 0.55 to either 0.63 or even 0.67.

As we, and many others, have noted on numerous previous occasions, including our previous letters to the CEC[3],[4] (see enclosed), the changes being proposed:

- Have not been justified economically or scientifically
- Will likely lead to significant market disruption
- May eliminate products from use that have some of the longest track records of performance in the State

[1] Roof Reflectance and Energy Savings: An Incremental Analaysis, presented by Dr. J. Hoff, CEIR, to the CEC on June 10, 2011

[2] Letter from Dr. J. Hoff to the CEC, dated July 19, 2011

[3] Letter from Sika Sarnafil's S. Graveline to the CEC dated July 18, 2011

[4] Letter from Sika Sarnafil's B. Whelan to the CEC dated 08/15/ 2011

- Provide insufficient time for manufacturers to adequately adapt their product line to meet the new requirements without potentially sacrificing durability and other important product attributes
- Impact employment in the roofing industry in the State.

The proposed changes could not come at a worse time. The overall economic climate nationally, and more importantly in the State, and the supply issues with titanium dioxide, the most important component for increasing reflectivity in most roofing technologies are far from ideal for such drastic changes to the energy code.

We understand the CEC's desire to continuously improve the State's Energy Code. However we strongly object to any changes being made and implemented in the 2013 code release. The CEC should work with all stakeholders to map out a comprehensive road map for the future that would set reasonable targets and define time frames that would allow for the appropriate product development cycles.

Should the Commission decide to implement a change for 2013, we recommend it not exceed 0.05, or a minimum prescriptive three year aged value of 0.60, and that the development of a road map as referenced above be initiated without delay.

Proceeding in this manner has the following advantages:

- Manufacturers will have clear, achievable targets to meet
- This provides time for development and testing/ rating
- Products with a long history of proven performance, will be permitted the opportunity to meet the requirements without interrupting supply to customers that value the quality and performance of their products
- Companies with significant investments in the state will have the opportunity to adapt their products rather than simply abandoning the State
- Improvements can be calibrated to what we can only hope will be improvements in the titanium dioxide supply chain.

Thank you for this opportunity to comment on the proposed change. Please do not hesitate to contact the undersigned should you have any questions.

Best regards
Sika Sarnafil
A Division of Sika Corporation

S.P. Graveline
Vice President Technical Services

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SENT BY E-MAIL TO: docket@energy.state.ca.us, and by USPS

July 18, 2011

California Energy Commission
Dockets Office
1516 Ninth Street
Sacramento, CA 95814-5512

Re: Docket No. 10-BSTD-01

We are writing to you to comment on the proposal to change the prescriptive aged reflectivity requirement within Title 24, from 0.55 to 0.70 or possibly 0.67. It is our understanding that this change, if adopted, would become effective January 1, 2014.

Sika Sarnafil has long been a strong advocate for cool roofing. We have held positions on the Cool Roof Rating Council's (CRRC) Board of Directors and/ or Technical Committee from its earliest days. The undersigned is currently a voting member on the Technical Committee. Sika Sarnafil (Sarnafil Inc. at that time) was a Charter Member of the Environmental Protection Agency's (EPA) Energy Star Roofing Program. We have participated in and/or sponsored a number of Lawrence Berkley National Laboratory (LBNL) studies on cool roofing including "Measured Energy Savings and Demand Reduction from a Reflective Roof Membrane on a Large Retail Store in Austin"[1], one of the first studies to measure and quantify the energy savings and other benefits of cool roofs in the field.

Our products are protecting some of California's most important buildings such as the State Capitol, the Staples Center, over 100 buildings for the University of California system, over 25 facilities for the California Department of Corrections, Los Angeles City Hall, Honda Center, USC campus buildings including the Galen Center, LAX Airport buildings, Northrop Grumman, Lockheed, Boeing and countless other facilities.

We applaud the California Energy Commission for their foresight in the development and implementation of the various requirements in Title 24, most notably the use of cool roofs. With its size, the State can, and does, drive innovation and change not only within its own borders but across the country. We understand, and fundamentally support, the CEC's desire to "raise the bar" within the State's Energy Code. We do however have numerous serious concerns about the proposed changes, including:

- The economic impact

[1] Konopacki, S., Akbari, H., Measured Energy Savings and Demand Reduction from a Reflective Roof Membrane on a Large Retail Store in Austin, Ernest Orlando Lawrence Berkeley National Laboratory, June, 2001, LBNL-47149

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- The magnitude of the change of the prescriptive aged reflectivity
- The significant disruption of the entire low slope roofing market
- The timeframe for implementation

The CEC has not presented any data demonstrating any significant benefit to making such a dramatic change. The Center for Environmental Innovation in Roofing (CEIR)[2] on the other hand has shown that the incremental energy, and by extension cost, savings in moving from an aged reflectivity of 0.55 to 0.70 are minimal, ranging from fractions of a penny to a couple of cents per square foot per year.

According to the CEC's own evaluation, based on data from the CRRC's Rated Product Directory, less than 40% of listed single ply membranes, and less than 55% of listed coatings, that meet the current requirements, would meet the proposed 0.70 threshold. These numbers are, if anything conservative, as many products are sold under various names under private label agreements. Changing the value to 0.67, a small handful of additional products would meet the requirement. The net effect would still be roughly a 50% reduction in the number of products currently used in the State that could meet the prescriptive requirement

The manufacturers of these products have invested significant resources insuring compliance with the current requirements. Providing approximately 30 months notice to allow these vendors the opportunity to modify their products or introduce new products to meet the proposed requirements is unreasonable and unrealistic.

Roof coverings are first and foremost intended to protect the structure from the elements. They should be formulated to provide maximum durability, thereby imposing the lowest life cycle costs possible to the building owners. Although much artificial weathering and ageing testing is done on roof membranes as they are developed, only the test of time in the field, in various climates, in various roof system build-ups, over a variety of building types and occupancies, installed by contractors of a variety of skill levels, etc. can determine whether a given formulation of product will provide the desired life expectancy. Any change in formulation whether it be to improve reflectivity, fire resistance, cost or any other property, can have a significant impact on the overall performance of the material. Therefore formulation changes should only be implemented after extensive, long term, field testing programs. The development cycle for roofing materials is a very lengthy process. In order to protect their position in the State, manufacturers not meeting the proposed prescriptive requirement, would need to rush new, unproven formulations, developed specifically to meet the aged reflectivity requirement, into service. This would be done at significant risk of affecting product durability and life expectancy. A reduction of even a year of average life expectancy would change a

[2] Hoff, Dr. J.L., Center for Environmental Innovation in Roofing, "Roof Reflectance and Energy Savings: An Incremental Analysis, Presentation to the CEC Staff Workshop on Draft Revisions for Residential and Nonresidential Buildings for Possible Inclusion in the 20131 Building Energy Efficiency Standards, June 10, 2011

building owner's life cycle cost of a roof significantly. The magnitude of the cost impact would dwarf the negligible potential energy and cost savings as calculated by the CEIR.

Even if a product manufacturer had a formulation modification ready for market introduction, and they submitted it to be rated by the CRRC today, they would still not have their three year aged data by the implementation date. It is highly unlikely that many, if any, manufacturers are even in this position at this time.

Beyond the unreasonably short notice, increasing the requirement 27% or even 22% in a single step further compounds the challenge.

Although the CEC may be satisfied that "sufficient" products meet the proposed requirements, such an assessment is overly simplistic. Imposing the new requirements as proposed would eliminate products with some of the longest records of proven performance in the State. Sarnafil membranes have for example has been used in California since 1979. Close to 200 million square feet of our materials have been installed on approximately 7,000 projects across the State.

Sarnafil S327 has a three year aged reflectivity of 0.63 based on CRRC testing and would therefore not comply with the proposed prescriptive requirement. We know from actual studies that the same membrane actually has a higher aged reflectivity in California than the average CCRC ratings, however we would nonetheless fail to meet the new prescriptive requirement. Many major institutions have used Sarnafil membranes to protect their facilities for decades. The University of California at Davis for example, has Sarnafil on over 35 buildings, some as old as 31 years which are still in service. Despite this proven performance, UCD would no longer be able to use Sarnafil S327 and meet the prescriptive requirements of the code.

Sika has invested significant resources in the State of California, with three facilities and approximately 50 employees, more than half of which are employed in the Sika Sarnafil roofing business unit. The Sika Sarnafil product line is also the primary source of income for numerous independent sales representatives working in the State. Such a rapid, dramatic change in the Title 24 cool roofing prescriptive requirements would have a devastating effect on our business and would likely lead to a significant reduction in our presence in the State. For many other companies, the consequences could be even more dramatic, particularly in the coating segment, where it is conceivable that this could force many companies out of business.

From a technology perspective, the most effective way to improve on the reflectivity of roofing materials is by increasing their titanium dioxide loading. There is currently a significant shortage of titanium dioxide due to a ramping up in demand in emerging economies, which is coinciding with an industry retrenchment in capacity as plants were shut down during the recent economic downturn. Prices are escalating at record rates, and suppliers are placing their customers on

allocation, with no relief in site. Industry experts project that[3] "... the feedstock supply landscape is mostly written for the next four to five years. Almost nothing can be done to remedy the situation that is evolving. ... expects pricing in the feedstock sector to rise dramatically, with the undersupply situation to reach a crescendo in 2014 or 2015". The timing of the proposed changes could not be worse. Increasing the prescriptive aged reflectivity requirement at this time would cause an additional burden on TiO_2 supply, and undoubtedly lead to roofing product availability issues and/or increase the cost of reflective roofs for building owners.

In summary, we believe that:

- The magnitude of the change is much too great
- There is not sufficient economic justification for such a dramatic change
- The timeframe to implementation is much too short
- This may force manufacturers to compromise their development processes in order to protect market share, likely compromising overall product quality and durability
- Consumer choice will be dramatically reduced
- The timing for such a change could not be worse.

We strongly object to any changes being made and implemented in the 2013 code release. The CEC should work with all stakeholders to map out a comprehensive road map for the future that would set reasonable targets and define time frames that would allow for the appropriate product development cycles.

Should the Commission decide to implement a change for 2013, we recommend it not exceed 0.05, or a minimum prescriptive three year aged value of 0.60, and that the development of a road map as referenced above be initiated without delay.

Proceeding in this manner has the following advantages:

- Manufacturers will have clear, achievable targets to meet
- This provides time for development and testing/ rating
- Products with a long history of proven performance, will be permitted the opportunity to meet the requirements without interrupting supply to customers that value the quality and performance of their products
- Companies with significant investments in the state will have the opportunity to adapt their products rather than simply abandoning the State
- Improvements can be calibrated to what we can only hope will be improvements in the titanium dioxide supply chain.

The CEC is also apparently considering allowing the use of an insulation trade-off for products meeting a defined minimum reflectivity level, but not the prescriptive requirement. Should such

[3] Bender, E., TiO_2 Landscape Changing Rapidly, Paint and Coatings Industry Magazine, May, 2011

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an alternative compliance path be permitted, we propose it be based on a prescriptive minimum of 0.60 as noted above. Secondly, we concur with the CEIR that the insulation trade-offs being contemplated by the CEC are disproportionate to the energy impacts of the lower aged reflectivity levels. Our recommendation is shown in the second column in the following table:

Aged Reflectivity	CEC Insulation Increase Proposal	Sika Sarnafil Increase Proposal	CEIR Insulation Insulation Proposal
0.67	None	None	None
0.60	R-5	None	R-2
0.55	R-7	R-2	R-2
0.50	R-9	R-4	R-4
0.45	R-12	R-5	
0.40	R- 15	R-6	R-6
0.25	NA	R-8	R-8

Thank you for this opportunity to comment on the proposed change. Please do not hesitate to contact the undersigned should you have any questions.

Best regards
Sika Sarnafil
A Division of Sika Corporation

S.P. Graveline
Vice President Technical Services

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August 15, 2011

California Energy Commission
1516 Ninth Street
Sacramento, CA 95814-5512

Attention: Payam Bozorgchami

Dear Mr. Bozorgchami,

Thank you for inviting us to the August 4th conference call, along with other stakeholders regarding the proposal to change the prescriptive aged reflectivity requirement within Title 24 from 0.55 to 0.67.

We understand and support the need to improve energy efficiency of buildings and we believe that roofing can be a means to help improve this objective. We also understand by the comments made during the Aug 4th conference call that the CEC is required to improve energy efficiency each code cycle.

We have a few suggestions to help the CEC move forwards:

- Phase the move to 0.67 reflectivity over 2 code cycles. Move to 0.60 in 2013 and 0.67 in 2017.

  - This would allow companies to properly prepare and build long performing roofing. We expect that a jump to 0.67 at next code cycle would force companies to react and possibly cause other side effects including using unproven formulations that could result in reduced life expectancy.

  - $T10_2$ (Titanium Dioxide) which is utilized to make all roofing products white is experiencing a world-wide shortage. By phasing the reflectivity in two codes cycles, it could help manufacturer's better plan. The CEC needs to be aware of the possible side effects of their desire to improve reflectivity. It is possible that with the move to 0.67 reflectivity could result in further raw material shortages requiring production allocation and significant cost increases for building owners.

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- Consideration should be given to the fact that Title 24 and the CEC require CRRC listed data. The CRRC aged reflectivity comes from three non-California sites (Arizona, Illinois and Florida). We know from 30 years experience that most single-ply roofing products stay cleaner and have improved reflectivity in California than what is documented by CRRC.

- We support an insulation trade-off. The CEC should understand that it is a significant cost penalty and will result in market share loss for lower reflective products. Building owners are not likely to be willing to pay the additional costs. We support the proposed CEIR insulation trade off proposal.

We look forward to receiving the data and models used to make cost and life cycle assumptions promised during the August 4th conference call.

If you have any questions regarding our comments and suggestions please do not hesitate to call.

Respectively,

Brian Whelan
Sr. Vice President
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100 Dan Road
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CC:

Stan Graveline
Jay Thomas
Jesse Quezada
Peter Schmidt

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