

use make on the consumer's annual fuel bill); (4) whether accepted test methods are available to measure *in situ* performance; (5) how the results of *in situ* performance measurements could be described in a meaningful manner to consumers; and (6) the benefits and costs to consumers and sellers that would be associated with the use of the alternatives. 64 FR 48027–29 (discussion of comments from Greenstone/Tranmer).

Comments

Two commenters supported no change to the Rule. PIMA asserted that there are no test procedures currently available for *in situ* applications. It pointed out that ASTM C 236, C 96 and C 1363 (a new standard that combines 236 and 976) are lab methods that require steady-state conditions and are not appropriate for *in situ* measurements. PIMA maintained that, while ASTM C 1041 and C 1046 apply to field use, they are used to measure heat flux on buildings, complicated calculations are necessary to extrapolate R-values, and the results are intended for use by skilled industry practitioners.²⁰

NAIMA contended that it would be impossible to determine new R-value requirements to take these factors into account and that, in the end, such disclosures would create consumer confusion rather than clarity. NAIMA asserted that once results of *in situ* performance of many fibrous insulations over a range of temperature conditions were analyzed, initial concerns raised by the cold-temperature effects abated because these temperatures rarely lasted long enough to result in significant energy loss or economic cost.²¹ NAIMA also maintained that no one term fully explains all aspects of performance. In its view, many consumers would be confused by the use of other terms like the Rayleigh number, and the explanations that would be needed if other factors were included in the Rule would be cumbersome and confusing. NAIMA explained that, even though extreme temperature differentials are a potential problem in a limited part of the country, consumers throughout the country would be exposed to the concern through national marketing programs. NAIMA echoed PIMA's concern that ASTM C 1363 lacks application to a real home setting where conditions are variable and unpredictable. NAIMA maintained that, in light of such variables, the likelihood of obtaining dependable and

authoritative *in situ* R-values remains a distant possibility, and any attempt to explain the myriad of factors would overwhelm consumers and defeat the purpose behind the Rule's disclosure requirements.²²

Two commenters supported a change to the Rule in this regard. CIMA noted that, for dry-applied loose-fill cellulose insulation, large temperature differentials may in fact increase the material's R-value. It referred to tests conducted at ORNL on loose-fill fiberglass insulation that showed a 40% to 50% decrease in R-value in simulated extremely cold climates, while identical tests on dry-applied loose-fill cellulose insulation showed that the R-value actually increased from R-18 at 40° F to R-20.3 at 18°. CIMA maintained that this difference in performance at cold conditions must be addressed in the Rule for competitive fairness and to protect consumers in cold climates. To accomplish this, CIMA recommended that the Commission expand the Rule to cover the airflow resistance of insulation (determined at the insulation's settled density) as well as the laboratory-determined R-value.

CIMA explained that airflow resistance can be determined in the laboratory by measuring simultaneously the pressure difference and airflow rate across a test specimen of known dimensions. This yields the airflow permeability, which can be used to calculate the Airflow Resistance Index ("ARI"), a scale from near zero to approximately 100 that CIMA maintained could provide a simple way for consumers to compare products. CIMA contended that it is possible to calculate the impact of convection on R-value using published technical information, and maintained that a newly adopted ASTM standard (ASTM C 1373) contains a method for measuring the effect of free convection on thermal resistance. CIMA recommended amending the Rule to require disclosure of the ARI-value in labels, fact sheets and ads.²³

Uniwood supported the development of an alternative method of measuring the relative insulating performance because, it maintained, the R-value alone ignores cost considerations and, as such, is misleading to consumers (a goal of the Rule is "meaningful, cost-based purchasing decisions"). It suggested that the Commission convene an advisory panel to recommend alternative methods that would account for all variables, including air permeability and temperature

difference. Until the results of such a panel are implemented, Uniwood suggested that the Rule require the disclosure of Rayleigh numbers.²⁴

Discussion

As the Commission explained in the ANPR, the Rule requires that R-values be determined according to ASTM test methods that provide R-value measurements under "steady-state" or "static" laboratory conditions, which do not take into account transient environmental factors (like circulation) that can affect insulation performance in actual use. Past evidence on the rulemaking record indicates that, although environmental conditions may affect the R-value number determined in steady-state tests, these conditions will affect competing home insulation products in approximately the same manner. See 64 FR 48027–28. Thus, the Commission continues to believe that the ASTM steady-state R-value test methods permit fair comparisons of product R-values on a standardized basis and provide consumers with a reliable, uniform, and comparative basis for their purchasing decisions. See discussion at 64 FR 48028–29.

As CIMA asserted, more recent information may indicate differences in the performance of various home insulation products at very low temperatures. The Commission understands that there are variables for which the uniform test methods specified in the Rule may not account, such as the design characteristics and geographical location of the building, the specific application in which the product is installed, outside and inside temperatures, air and moisture movement, installation technique, and others. The Commission believes that any effort to reflect these variables in the Rule's requirements would significantly complicate both compliance and communication to consumers, without a commensurate level of benefit. Accordingly, the Commission is not proposing to expand the Rule's requirements at this time to cover variables that might affect insulation performance in actual use.

Manufacturers and other sellers, however, may provide additional, truthful, substantiated information voluntarily to consumers about the manner in which their products perform in actual use. For example, if a product exhibits increased performance at high temperature differentials and such performance is not reflected by the disclosure requirements of the R-value Rule, the manufacturer may provide that

²⁰ PIMA (3), pp. 9–10.

²¹ See NAIMA (9), Appendix 14.

²² NAIMA (9), pp. 9–10.

²³ CIMA (4), pp. 3–6.

²⁴ Uniwood (11), pp. 1–2.