

**FEDERAL TRADE COMMISSION****16 CFR Part 460****Trade Regulation Rule: Labeling and Advertising of Home Insulation**

**AGENCY:** Federal Trade Commission.

**ACTION:** Advance notice of proposed rulemaking.

**SUMMARY:** The Federal Trade Commission ("Commission") proposes commencing a rulemaking proceeding to amend its Trade Regulation Rule Concerning the Labeling and Advertising of Home Insulation ("R-value Rule" or "Rule"). The purpose of the rulemaking is to streamline and increase the benefits of the Rule to consumers and sellers, minimize its costs, and respond to the development and utilization of new technologies to make American homes more energy efficient and less costly to operate. This document: First, summarizes public comments the Commission received in response to a request for comments about the need for the rule and its benefits and burdens; second, proposes amendments to recognize technological advances in R-value testing and specimen preparation procedures, and to clarify and streamline the Rule's requirements; and third, solicits comments on the proposed amendments and additional issues.

**DATES:** Written comments must be submitted on or before November 15, 1999.

**ADDRESSES:** Five paper copies of each written comment should be submitted to the Office of the Secretary, Federal Trade Commission, Room 159, 600 Pennsylvania Ave., N.W., Washington, D.C. 20580. All comments also should be submitted, if possible, in electronic form, on a 3½ inch personal computer diskette, with a label on the diskette stating the name of the commenter and the name and version of the word processing program used to create the document. Programs based on DOS are preferred. Files from other operating systems should be submitted in ASCII text format. Individuals filing comments need not submit multiple copies or comments in electronic form. Comments alternatively may be submitted by electronic mail (e-mail) to <rvalue@ftc.gov>. Submissions should be identified as "ANPR Comment, R-value Rule, 16 CFR Part 460."

**FOR FURTHER INFORMATION CONTACT:** Kent C. Howerton or James G. Mills, Attorneys, Federal Trade Commission, Washington, DC 20580, (202) 326-3013 or (202) 326-3035 (voice), or (202) 326-3259 (FAX).

**SUPPLEMENTARY INFORMATION:****I. Introduction**

According to the U.S. Department of Energy ("DOE"), the typical U.S. family spends close to \$1,300 each year on energy bills. DOE statistics show that, typically, 44% of a homeowner's utility bill goes for heating and cooling costs. DOE states that homeowners may be able to reduce their energy bills from 10% to 50% by taking certain steps.<sup>1</sup> One of the major steps is increasing the amount of thermal insulation in their existing homes, or purchasing additional insulation when purchasing new homes.

To assist consumers in reducing energy bills, the President of the United States announced in 1998 the Partnership for Advancing Technology in Housing ("PATH"). PATH is a public/private sector initiative that seeks to expand the development and utilization of new technologies in order to make American homes stronger, safer and more durable; more energy efficient and environmentally friendly; easier to maintain and less costly to operate; and more comfortable and exciting to live in. The PATH effort is expected to result in, among other things, improved energy efficiency and the increased market acceptance of new housing technologies.

The FTC has long recognized the importance of energy expenditures on housing to homeowners and other consumers. In 1979, the Commission promulgated the R-value Rule, 16 CFR Part 460. The R-value Rule requires that thermal insulation manufacturers and other sellers disclose the thermal performance of their products, based on uniform testing procedures adopted by the thermal insulation industry. The purpose of this Rule is to provide consumers with information about thermal insulation products, based on uniform standards, that allows them to make meaningful, cost-based purchasing decisions among competing products. As part of its ongoing program to review all its rules and guides to ensure that they provide the maximum benefits at the lowest cost, the Commission reviewed the R-value Rule in 1995 and

<sup>1</sup>The amount of energy savings a particular homeowner can save, of course, will vary depending on individual circumstances. DOE provides recommendations about the amount of insulation homeowners need, based on local heating and cooling costs and climate conditions. DOE's recommendations are based on the cost-effectiveness of the recommended insulation levels. For more information, see <[http://www.eren.doe.gov/consumerinfo/energy\\_\\_>savers/](http://www.eren.doe.gov/consumerinfo/energy__>savers/)> on the Internet, or telephone the U.S. Department of Energy's Energy Efficiency and Renewable Energy Clearinghouse ("EREC") at (800) 363-3732.

adopted amendments in 1996 to support the use of the most current testing procedures available and to streamline the Rule.

To increase further the benefits of the Rule, reduce its costs, and support PATH's goals to make American homes more energy efficient, and less costly to operate, the Commission now proposes to consider amending the Rule to recognize the latest technology available. At this time the Commission proposes only a few limited amendments, which are designed to clarify the Rule, make disclosure requirements consistent for competing types of loose-fill insulation products, require the most current procedures for preparing R-value test specimens and conducting R-value tests, delete disclosures for a type of insulation that no longer is sold, and reduce disclosure requirements for retailers. Regarding these issues, the Commission believes that there is sufficient information to propose amendments. Regarding other issues, the Commission is not proposing amendments at this time, but seeks additional comment that could ultimately result in proposed amendments. The Commission, therefore, requests comments on additional issues, such as whether the Commission should revise the Rule to cover additional products or to require the disclosure of in-use performance values (as opposed to laboratory tests that are conducted under static, uniform conditions) or of the performance of building systems. In addition, the Commission requests comments on whether it should adopt additional test specimen preparation requirements for specific types and forms of insulation products to account for various factors that affect R-values; adopt additional or updated testing requirements; and revise the disclosure requirements for manufacturers' label and fact sheets, advertisements and other promotional materials, and for professional installers, new home sellers, and retailers.

**II. The R-Value Rule**

The Commission promulgated the R-value Rule on August 29, 1979<sup>2</sup> under section 18 of the Federal Trade Commission Act ("FTC Act"), 15 U.S.C. 57a. The Rule became effective on September 30, 1980. The Rule specifies substantiation and disclosure requirements for those who sell thermal insulation products for use in the residential market, and prohibits certain claims unless they are true. The primary

<sup>2</sup>Final trade regulation rule ("Statement of Basis and Purpose" or "SBP"), 44 FR 50218 (1979).

disclosure required is the insulation product's "R-value." "R-value" is the recognized numerical measure of the ability of an insulation product to restrict the flow of heat and, therefore, to reduce energy costs. R-values may be expressed per unit of thickness (e.g., one inch) or for the total thickness of a particular insulation product or installation. The higher the R-value, the better the product's insulating ability.

On April 6, 1995, as part of its ongoing regulatory review program, the Commission solicited public comments about the economic impact of and current need for the R-value Rule.<sup>3</sup> 60 FR 17492 (1995). At the same time, the Commission solicited comments on a petition ("Petition") from Ronald S. Graves, who at that time was a Research Staff Member, Materials Analysis Group, Martin Marietta Energy System, Inc. (which operates Oak Ridge National Laboratory ("ORNL") for the U.S. Department of Energy ("DOE")). The Petition requested that the Commission approve an additional (fifth) R-value test procedures, as an optional test procedure for determining the R-value of home insulation under the Rule. The test procedure had been issued by the American Society for Testing and Material ("ASTM"), a voluntary industry standards organization.

In response to the request for comments, the Commission received 42 comments from manufacturers of cellular plastics, cellulosic, mineral fiber, and reflective insulation products; manufacturers of structural insulated panels; trade associations comprised of manufacturers of insulation products and structural insulated panels, professional installers, and roofing contractors; independent technical consultants to industry; a government contractor; and individual consumers.<sup>4</sup>

<sup>3</sup>The Commission previously reviewed the Rule in 1985 under the Regulatory Flexibility Act, 5 U.S.C. 610, to determine the economic impact of the Rule on small entities. Based on that review, the Commission determined that: there was a continuing need for the Rule; there was no basis to conclude that the Rule had a significant impact on a substantial number of small entities; there was no basis to conclude that the Rule should be amended to minimize its economic impact on small entities; the Rule did not generally overlap, duplicate, or conflict with other regulations; and technological, economic, and other changes had not affected the Rule in any way that would warrant amending the Rule. 50 FR 13246 (1985).

<sup>4</sup>The April 6, 1995 request for comments is filed as document number B172394. The comments filed in response to the request for comments are listed in the attached Appendix, alphabetically according to the citation abbreviations used in this notice. The comments are filed as document numbers B17239400001, B17239400002, etc. In today's notice, the comments are cited as #01, #02, etc. They are available for inspection in Room 130 at the Commission's Headquarters at 600 Pennsylvania Avenue, NW, Washington, DC.

Thirty of the 31 comments that addressed the current need for the Rule stated that there is a continuing need for the Rule (and its requirements that manufacturers and other sellers substantiate and disclose the R-values of home insulation products). Twenty-four comments described benefits that the current Rule, and the disclosure of R-values and related information, confer on consumers and home insulation sellers, including: (1) Giving consumers the basic thermal performance information (i.e., R-values) they need to select products with the R-value they want; (2) giving consumers R-value information in a uniform manner that facilitates easy comparison of competing products; (3) requiring that R-value claims be substantiated so consumers receive what they are promised; (4) helping consumers save energy (and heating and cooling costs) by preventing misrepresentations about R-values of insulation products; (5) saving consumers money by eliminating marketing practices that lead them to over- or underinsulate; (6) improving the quality and consistency of home insulation and encouraging the development of advanced products; and (7) creating a "level playing field" for competing insulation sellers.<sup>5</sup> Most of the comments stated that the costs the Rule imposes on consumers and sellers are minimal.

Based on the comments, the Commission determined that there is a continuing need for the Rule, published its determination to retain it, and adopted several technical, non-substantive amendments to support the use of the most current testing procedures available and to streamline the Rule.<sup>6</sup> 61 FR 13659, at 13659-62, 13665 (1996). The comments also discussed other issues and

<sup>5</sup>In addition to these benefits, one comment explained that utility companies have embraced the Rule and developed their own energy savings programs that depend on the Rule to protect consumers. The comment also stated that state departments of consumer affairs have used the Rule as a model in writing their regulations, which has led to state enforcement that has generated publicity and educated consumers.

<sup>6</sup>These amendments: (1) Revised section 460.5 of the Rule to allow the use of an additional ASTM test procedure as an optional, but not required, test procedure to determine the R-value of home insulation; (2) revised section 460.5 to require the use of current, updated versions of other ASTM R-value test methods cited in the rule; (3) added an Appendix summarizing the exemptions from specific requirements of the Rule that the Commission previously granted for certain classes of persons covered by the Rule; and (4) revised section 460.10 of the Rule to cross-reference the Commission's enforcement policy statement for foreign language advertising in 16 CFR 14.9 and deleted the previous Appendix to the Rule because it merely repeated the text of 16 CFR 14.9.

recommended that the Commission consider additional Rule amendments. These comments, the Commission's discussion of the issues the comments raised, proposed revisions to the Rule, and objectives and regulatory alternatives to the proposed revisions, are summarized in Part IV.

### III. Overview of the Rule<sup>7</sup>

#### A. Products Covered

The R-value Rule covers all "home insulation products." Under the Rule, "insulation" is any product mainly used to slow down the flow of heat from a warmer area to cooler area, for example, from the heated interior of a house to the exterior during the winter through exterior walls, attic, floors over crawl spaces, or basement. "Home insulation" includes insulation used in all types of residential structures. The Rule automatically covers new types or forms of insulation marketed for use in the residential market, whether or not they are specifically referred to in the Rule. The Rule does not cover pipe insulation, or any type of duct insulation except for duct wrap. The Rule does not cover insulation products sold for use in commercial (including industrial) buildings. It does not apply to other products with insulating characteristics, such as storm windows or storm doors.

Home insulation includes two basic categories: "mass" insulations and

<sup>7</sup>This part of the notice outlines the coverage and requirements of the R-value Rule. Home insulation sellers should be aware, however, that additional Commission rules or guides may also apply to them. For example, the Commission's rules concerning Disclosure of Written Consumer Product Warranty Terms and Conditions, and the Pre-sale Availability of Written Warranty Terms, 16 CFR Parts 701 and 702, specify requirements concerning warranties for home insulation products; the Commission's Guides for the Use of Environmental Marketing Claims, 16 CFR Part 260, address the application of section 5 of the FTC Act, 15 U.S.C. 45, to environmental advertising and marketing claims (e.g., claims concerning the amount of recycled material a product contains). Further, section 5 of the FTC Act declares that unfair or deceptive acts or practices are unlawful, and requires that advertisers and other sellers have a reasonable basis for advertising and other promotional claims before they are disseminated. See Deception Policy Statement, Letter from the Commission to the Honorable John D. Dingell, Chairman, Committee on Energy and Commerce, U.S. House of Representatives (Oct. 14, 1983), reprinted in Cliffdale Assocs., Inc., 103 F.T.C. 110 (1984); Statement of Policy on the Scope of the Consumer Unfairness Jurisdiction, Letter from the Commission to the Honorable Wendell H. Ford, Chairman, Consumer Subcommittee, Committee on Commerce, Science, and Transportation, U.S. House of Representatives, and the Honorable John C. Danforth, Ranking Minority Member, Consumer Subcommittee, Committee on Commerce, Science, and Transportation, U.S. Senate (Dec. 17, 1980), reprinted in International Harvester Co., 104 F.T.C. 949 (1984); and Policy Statement Regarding Advertising Substantiation, 49 FR 30999 (1984), reprinted in Thompson Medical Co., 104 F.T.C. 839 (1984).

"reflective" insulations. Mass insulations reduce heat transfer by conduction (through the insulation's mass), convection (by air movement within and through the air spaces inside the insulation's mass), and radiation. Reflective insulations (primarily aluminum foil) reduce heat transfer not through the mass of the product, but, when installed facing an airspace, by increasing the thermal resistance of the airspace by reducing heat transfer by radiation through it. 44 FR at 50219. Within these basic categories, home insulation is sold in various types ("type" refers to the material from which the insulation is made, e.g., fiberglass, cellulose, polyurethane, aluminum foil) and forms ("form" refers to the physical form of the product, e.g., batt, dry-applied loose-fill, spray-applied, boardstock, multi-sheet reflective).

#### B. Parties Covered

The Rule applies to home insulation manufacturers, professional installers, retailers who sell insulation to consumers for do-it-yourself installation, and new home sellers (including sellers of manufactured housing). It also applies to testing laboratories that conduct R-value tests for home insulation manufacturers or other sellers who use the test results as the basis for making R-value claims about home insulation products.

#### C. Purpose of the Rule

The main reason consumers purchase home insulation is to reduce energy expenditures to heat and cool their homes. To assist consumers, the Rule requires sellers (including insulation manufacturers, professional installers, new home sellers, and retailers) to disclose the insulation product's R-value and related information, prior to retail sale, based on uniform, industry-adopted standards. This information enables consumers to evaluate how well a particular insulation product is likely to perform, to determine whether the cost of the insulation is justified, and to make meaningful, cost-based purchasing decisions among competing products.

#### D. Basis for the Rule

The Commission issued the R-value Rule to prohibit, on an industry-wide basis, specific unfair or deceptive acts or practices. When it issued the Rule, the Commission found that the following acts or practices were prevalent in the home insulation industry and were deceptive or unfair, in violation of section 5 of the FTC Act, 15 U.S.C. 45: (1) Sellers had failed to disclose R-value, and caused substantial consumer injury by impeding the ability of

consumers to make informed purchasing decisions, 44 FR at 50222-23; (2) the failure to disclose R-values, which vary significantly among competing home insulation products of the same thickness and price, misled consumers when they bought insulation on the basis of price or thickness alone, *Id.* at 50223; (3) sellers had exaggerated R-values, often failing to take into account factors (e.g., aging, settling) known to reduce thermal performance, *Id.* at 50223-24; (4) sellers had failed to inform consumers about the meaning and importance of R-value, which consumers need to understand R-values, *Id.* at 50224; (5) sellers had exaggerated the amount of savings of fuel bills that consumers could expect, and often failed to disclose that savings will vary depending on the consumer's particular circumstances, *Id.*; and (6) sellers had falsely claimed that consumers would qualify for tax credits through the purchase of home insulation, or that products had been "certified" or "favored" by federal agencies, *Id.*

#### E. Requirements of the Rule

The Rule requires that manufacturers and others who sell home insulation determine and disclose each product's R-value (and related information—e.g., thickness, coverage area per package) on package labels and manufacturers' fact sheets. R-value ratings vary among different types and forms of home insulations and among products of the same type and form. The Rule requires that R-value claims to consumers about specific home insulation products be based on uniform R-value test procedures that measure thermal performance under "steady-state" (i.e. "static") conditions.<sup>8</sup> Mass insulation

<sup>8</sup> Section 460.5 of the Rule requires that the R-values of home insulation products be based on one of the following R-value test procedures adopted by ASTM: (1) ASTM C 177-85 (Reapproved 1993): Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transition Properties by Means of the Guarded-Hot-Plate Apparatus ("ASTM C 177-85 (1993)" or "Guarded Hot Plate"); (2) ASTM C 236-89 (Reapproved 1993): Standard Test Method for Steady-State Thermal Performance of Building Assemblies by Means of a Guarded Hot Box ("ASTM C 236-89 (1993)" or "Guarded Hot Box"); (3) ASTM C 518-91: Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transition Properties by Means of the Heat Flow Meter Apparatus ("ASTM C 518-91" or "Heat Flow Meter"); (4) ASTM C 976-90: Standard Test Method for Thermal Performance of Building Assemblies by Means of a Calibrated Hot Box ("ASTM C 976-90" or "Calibrated Hot Box"); and (5) ASTM C 1114-95: Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Thin-Heater Apparatus ("ASTM C 1114-92" or "Thin-Heater Apparatus"). R-values determined according to ASTM C 177-85 (1993) or ASTM C 518-91 must be reported in accordance with ASTM C 1045-90: Standard Practice for Calculating Thermal Transmission Properties from Steady-State Heat Flux Measurements ("ASTM C 1045-90"). The

products may be tested under any of the test methods, reflective insulation products must be tested according to either ASTM C 236-89 (1993) or ASTM C 976-90, which can determine the R-value of insulation systems (such as those that include one or more air spaces).<sup>9</sup> The tests must be conducted at a mean temperature of 75°F. The tests on mass insulation products must be conducted on the insulation material alone (excluding any airspace).

When it promulgated the Rule, the Commission found that certain factors, such as aging or settling, affect the thermal performance of home insulation products. 44 FR at 50219-20, 50227-28. To ensure that R-value claims take these factors into account, the Rule mandates that the required R-value tests for polyurethane, polyisocyanurate, and extruded polystyrene insulation products be conducted on test specimens that fully reflect the effect of aging,<sup>10</sup> and for loose-fill insulation products on test specimens that fully reflect the effect of settling.<sup>11</sup>

Specific disclosures must be made: (1) By manufacturers on product labels and manufacturers' fact sheets; (2) by professional installers and new home sellers on receipts or contracts; and (3) by manufacturers, professional installers, and retailers in advertising and other promotional materials (including those on the Internet) that contain an R-value, price, thickness, or energy-savings claim, or compare one type of insulation to another. Manufacturers and other sellers must have a "reasonable basis" for any energy savings claims they make.<sup>12</sup>

Commission gave manufacturers and others the option of choosing among those test procedures because it determined that all are highly accurate and reproducibly steady-state test methods that yield uniform and reliable results. 44 FR at 50226; Final rule, 55 FR 10053, at 10054 (1990); Final rule, 61 FR 13659, at 13662-63 (1996). ASTM reviews and revises each of these procedures periodically. Under section 460.7 of the Rule, the Commission will accept, but not require, the use of a revised version of any of these standards 90 days after ASTM adopts and publishes the revision. The Commission may, however, reopen the rulemaking proceeding during a 90-day period or at any later time to consider whether it should require use of the revised procedure or reject it under section 460.5 of the Rule. 61 FR at 13663.

<sup>9</sup> The R-value of a single-sheet reflective insulation product may be determined according to an alternative method. See Part IV.D.2, *infra*.

<sup>10</sup> See Part IV.C.1.a, *infra*.

<sup>11</sup> See Part IV.C.2.a, *infra*.

<sup>12</sup> Although the Rule does not specify how energy savings claims must be substantiated, the Commission explained that scientifically reliable measurements of fuel use in actual houses or reliable computer models or methods of heat flow calculations would meet the reasonable basis standard. 44 FR at 50233-334. Sellers other than manufacturers can rely on the manufacturer's claims unless they know or should know that the manufacturer does not have a reasonable basis for the claims.

#### IV. Discussion of Comments, Proposed Amendments, Objectives, and Regulatory alternatives

This part of the notice summarizes and discusses the issues raised by the comments, including suggestions that the Commission revise the Rule. In analyzing the comments, the Commission has considered whether the suggested revisions would further the Commission's objective of ensuring that consumers receive information about home insulation products prior to purchase in a uniform, reliable, and substantiated manner, so that they can evaluate how well a particular product is likely to perform and make meaningful, cost-based purchasing decisions. In addition, the Commission has considered alternatives to amending the Rule to impose new requirements on an industry-wide basis, such as dealing with questionable claims or practices on a case-by-case basis, or exploring other mechanisms such as consumer and business education or industry self-regulation. Below, the Commission explains, on an issue-by-issue basis, whether it proposes amending the Rule as suggested by the comments. Both Parts IV and V include specific issues and questions on which the Commission solicits public comments.

##### A. Disclosing Thermal Performance of Additional Products

###### 1. Residential Pipe and Duct Insulations

###### Comments

Dr. Kenneth E. Wilkes, for ORNL, recommended amending the Rule to include pipe insulations and all types of duct insulations, and listed the applicable ASTM test methods that apply to these products. Dr. Wilkes stated that the disclosure of R-value information would provide important information for purchasers of these products.<sup>13</sup>

###### Discussion

The Commission excluded pipe insulation based on uncontroverted evidence in the original rulemaking proceeding that it was used primarily to prevent moisture condensation on low temperature lines, not for energy conservation; that R-value was not a reliable basis for comparing the performance of pipe insulations; and that pipe insulations were not commonly advertised in terms of energy-savings potential.<sup>14</sup> Similarly, it

excluded duct insulations other than duct wrap because only duct wrap was used extensively in the residential setting. 44 FR at 50238 n.170. The Commission's staff has reviewed current consumer advertising for these products and found no information to indicate that these facts have changed. Unless interested parties have information that sellers are misrepresenting the thermal performance of these products to consumers, the Commission will not propose extending the Rule to cover them.

###### 2. Non-residential Insulations

###### Comments

Two comments suggested extending the Rule to cover insulation products used in all buildings, not just residential applications. Dr. David W. Yarbrough, for Tennessee Technological University ("TN Tech."), asserted that extending the Rule to cover commercial building insulations would improve the energy efficiency of buildings and would contribute to the nation's energy conservation effort without imposing a measurable increased cost on manufacturers.<sup>15</sup> Dr. Wilkes, for ORNL, stated that the Rule has improved both the marketplace and the technology for home insulations and contended that similar improvements are needed in the commercial market and would occur if the Rule's coverage were expanded.<sup>16</sup> In contrast, Celotex stated that the Commission should not extend the Rule to cover commercial applications because commercial insulations are purchased primarily by professional architects, engineers, and specification writers.<sup>17</sup>

###### Discussion

Although applying the Rule to thermal insulation products used in commercial buildings might provide information to purchasers that could improve the energy efficiency of buildings, and otherwise prove useful, the comments do not demonstrate that sellers of commercial insulations are engaged in unfair or deceptive acts or practices that would justify expanding the Rule. Furthermore, in many instances, thermal insulation purchasing decisions for commercial building applications are made by architects or engineers. These professionals may require R-value and other performance information based on

(16 CFR Part 460), July 1978 ("Staff Report"), at 21-22, 188.

<sup>15</sup> TN Tech, #26, at 1.

<sup>16</sup> ORNL/Wilkes, #29, at 3.

<sup>17</sup> Celotex, #25, at 1.

circumstances different than the uniform approach the Commission determined was necessary to provide accurate and understandable information to individual consumers to compare competing products and make purchasing decisions.

In limiting the disclosure requirements to materials distributed "for consumer use," the Commission recognized that insulation manufacturers often prepare detailed, technical data for building industry professionals, who should already be informed concerning thermal insulation performance. The Commission also recognized that manufacturers may wish to provide these professionals with additional information or with information in a different form from that required for consumer use. 44 FR at 50225.

For these reasons, the Commission does not propose extending the Rule to cover sales to the commercial market. If interested parties have evidence that sellers in this market are misrepresenting the thermal performance of insulation products or are engaging in other unfair or deceptive practices, however, the Commission invites them to submit this information.

##### B. Disclosing In-Use Thermal Performance Values

###### 1. Performance of Insulations in Actual Use

Eleven comments discussed seasonal and other variables that can affect the R-value of insulation products in actual use, and suggested that the Rule does not sufficiently account for these factors.<sup>18</sup>

###### Comments Regarding Factors That Affect Performance in Attics During Winter Conditions

Ten of these comments discussed the reduction in R-value of very low density fibrous insulations (e.g., those at approximately 0.7 pounds per cubic foot or less) installed in open or vented attics that can result from convective currents when the outside temperature (and that in the attic) is particularly low.<sup>19</sup> CIMA stated that when the Rule was promulgated it was assumed that R-

<sup>18</sup> Benchmark #04, at 1; Regal, #16, at 3; CIMA, #19, at 3-5; GreenStone/Tranmer, #20, at 2; BASF, #21, at 1; Hamilton, #22, at 1-2; ECI, #23, at 1; Superior, #27, at 1; ORNL/Wilkes, #29, at 4-5; GreenStone/Smith, #32, at 2; Tascon, #35, at 2.

<sup>19</sup> Regal, #16, at 3; CIMA, #19, at 3-5; GreenStone/Tranmer, #20, at 2; Hamilton, #22, at 1-2; ORNL/Wilkes, #29, at 4-5; GreenStone/Smith, #32, at 2; Tascon, #35, at 2.

<sup>13</sup> ORNL/Wilkes, #29, at 3.

<sup>14</sup> See Final Staff Report to the Federal Trade Commission and Proposed Trade Regulation Rule

value was relatively unchanging over a wide range of temperatures. CIMA asserted that subsequent research by ORNL has shown a reduction of steady-state R-values caused by convective heat loss in very low density fiber insulation materials during very cold periods, when the temperature difference (delta T) between the heat area of a home and its cold attic becomes particularly great. CIMA stated that this phenomenon can reduce the steady-state R-value of affected products from 10% of a delta T of 50 °F to 55 °F (17 °F to 25 °F in the attic of a home heated to 72 °F) to as much as 40% at a delta T of 90 °F (– 18 °F in the attic of a home heated to 72 °F), which can occur during the most severe winter conditions in some portions of the United States. CIMA recommended that the Commission require that insulation manufacturers provide winter design correction factors in coverage charts to compensate for R-value erosion due to convective heat loss, and require that, if insulation material is not subject to R-value loss under cold conditions, the manufacturer state on the package label that the insulation is not subject to convective heat loss at winter attic temperatures above – 20 °F.<sup>20</sup>

Dr. Wilkes, for ORNL, pointed out that tests on very low density loose-fill fiberglass insulations with an airspace above the insulation (as in an open attic application) gave R-values that decreased by more than 50% from those determined at a mean test temperature of 75 °F value, when they were tested with a delta T greater than 72 °F and a mean test temperature of 70 °F. Dr. Wilkes explained that ASTM is developing a method of determining the thermal performance of attic insulations during winter conditions, ASTM C 1373,<sup>21</sup> and suggested that the Commission incorporate it into the Rule when it is adopted. This method is still under consideration by ASTM.

Mr. Tranmer, for GreenStone, asserted that several factors in addition to R-values that are determined under steady-state conditions have a major effect on product performance, such as air permeability and temperature differential. Mr. Tranmer stated that a measurement known as the Rayleigh number<sup>22</sup> provides a more complete

indication of the effect that the combination of R-value, air permeability, and temperature differential have on insulation materials under specific conditions, and that it represents a more accurate measure of insulating capabilities than R-value alone. He suggested that the Commission require the Rayleigh number on packages and promotional materials to give consumers a better measure of the overall effectiveness of insulation products.<sup>23</sup>

Mr. Tranmer also recommended that the Commission specify testing with the ORNL Large Scale Climate Simulator to provide more accurate information for all attic insulation products, and that these products be tested at temperatures from – 20°F to +120°F to provide consumers with performance information specific to a particular climate zone. He stated that, while the cost of testing in this apparatus is approximately \$20,000 (significantly more than the usual R-value test), the benefits through increased energy savings would more than offset the increase in testing costs.<sup>24</sup>

Citing research that heating energy consumption can vary 25% to 38% in structures insulated to the same nominal R-value with different insulation materials, CIMA similarly asserted that, by focusing only on R-value, the current Rule has the effect of misleading consumers into thinking that R-value is the only consideration when buying or specifying insulation. Recognizing that presently there is no perfect solution to this dilemma, CIMA suggested that Commission expand the Rule to require manufacturers to disclose Rayleigh numbers for materials under specific conditions. CIMA

fibers against that upward air movement. The higher the number, the stronger the buoyant force, and the greater the reduction of the insulation's steady-state R-value.

<sup>23</sup> GreenStone/Tranmer, #20, at 2–3. See also GreenStone/Smith, #32, at 2 (Rule leads consumers to believe that R-value is the most important factor in comparing insulations; not sufficient merely to state that other factors may affect insulation thermal performance if other important factors can be quantified; require testing for air permeability, R-value, and temperature difference to enable disclosure of a relative insulation performance factor (Rayleigh Number)), Hamilton, #22, at 2 (effects of convective heat loss on R-value could be communicated to consumers by an "air resistance index" number to give them a reference to compare insulation for certain applications; bag label should include warning about convection effect on lighter-density materials below 20 °F); Tascon, #35, at 1–2 (require determination of the effects of air convection on R-value and depiction of that effect at representative temperatures on coverage charts; require disclosure of the Rayleigh number); Regal, #16, at 3 (insulation performance and cost effectiveness should address not only R-value, but also resistance to heat flow and to convective effects under winter design conditions).

<sup>24</sup> GreenStone/Tranmer, #20, at 2–3.

asserted that the Rayleigh number combines the effects of R-value, air permeability, and temperature difference to produce an expression of relative insulation performance.

#### *Comments Regarding Factors That Affect Performance Under Winter Versus Summer Conditions*

One commenter, Superior, contended that the R-value test procedures presently required as the primary means of identifying heat transfer are no longer valid, because they were developed almost exclusively for winter conditions. Superior asserted that, with the post-World War II advent of air conditioning and a higher concern for summer comfort, the primary mode of heat transfer that should be measured is radiant heat. Superior explained that R-value is a component of conductive heat transfer, while radiant heat should be measured by its emissivity,<sup>25</sup> and contended that reflective insulations with one-half or less the steady-state R-value of fiberglass will stop more heat transfer into the home during summer conditions. Superior recommended that the Commission require manufacturers of all insulations to disclose winter and summer performance values, with the summer value determined according to a test procedure other than R-value tests, which have very little significance for radiant heat transfer during summer conditions.<sup>26</sup>

#### *Discussion*

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. These test methods do not take into account transient environmental factors, such as air circulation, that can have a significant effect on insulation performance in actual use (*i.e.*, on site, or *in situ*). When it promulgated the Rule, the Commission determined that, notwithstanding this limitation, these steady-state tests were the most reliable and accurate test methods available. In addition, evidence on the rulemaking record indicated that, although environmental conditions might affect the R-value number determined in steady-state tests, these conditions would affect competing home insulation products in approximately the same manner. Accordingly, the Commission

<sup>25</sup> "Emissivity" is a numerical measurement of the ability of a surface to reflect back radiant heat transfer. It is expressed as a number between 0.0 and 1.0. The lower the emissivity, the greater the ability to reflect radiant heat back. The inverse of emissivity is the product's "reflectivity" (also called the "reflectance").

<sup>26</sup> Superior, #27, at 1.

<sup>20</sup> CIMA, #19, at 3–4.

<sup>21</sup> Standard Practice for Determination of Thermal Resistance of Attic Insulation Systems Under Simulated Winter Conditions ("ASTM C 1373").

<sup>22</sup> The Rayleigh number is a measure of the tendency of air to move. In the context of very low density thermal insulations installed on the floor of an open attic during very cold periods, the Rayleigh number is a ratio between the buoyant force of warmer air (the air at the bottom of the insulation near the heated interior of the house) attempting to move upward and the resistance of the insulation

determined that use of the ASTM steady-state R-value test methods would permit fair comparisons of product R-values on a standardized basis to provide consumers with a reliable, uniform, and comparative base for their purchasing decisions. 44 FR at 50225-26. At the same time, while the Rule requires that R-values claimed must be based on the uniform test methods specified in the Rule, manufacturers and other sellers may provide additional, truthful, substantial information voluntarily to consumers about the manner in which their products perform in actual use.

The Commission recognizes that the testing of insulation products by means of steady-state laboratory testing procedures may not duplicate precisely the performance of an insulation product *in situ*. The thermal performance of any insulation product in actual use, however, is a highly complex subject that involves a broad range of parameters, including the design characteristics of the building and the specific application in which the product is installed (e.g., open attic, enclosed wall cavity), the geographical location, outside and inside temperatures, air and moisture movement, proper installation, and other variables. Determining the disclosing R-values under these varying circumstances, only some of which may apply to a particular use by a specific consumer, could result in multiple R-value disclosures that might overload rather than assist consumers in comparing insulation products and making purchase decisions. For these reasons, the Commission does not at this time propose specific amendments to require disclosures regarding *in situ* performance or multiple R-values for different uses.

Consumers, however, could benefit from the most up-to-date, accurate, and useful information, based on the best available research and substantiation. For example, in areas where a significant delta T is predictable, consumers might want to install additional insulation to take into account the reduction in R-value that might occur during extreme conditions, or consider installing a higher density product. The Commission, therefore, solicits comments on the alternatives to steady-state R-values (e.g., Rayleigh numbers, R-value disclosures based on temperature ranges for different regions of the country or for different applications) suggested by the commenters, or other alternatives, that would provide consumers with accurate, meaningful, and understandable information relevant to

their individual circumstances. The Commission requests that commenters address: (1) Specific alternative measurements that are available to describe the *in situ* use of home insulation products better than the steady-state R-values required by the rule; (2) which *in situ* conditions should be accounted for (and why); (3) whether (and how and to what extent) different types or forms of home insulation products perform differently under specific *in situ* conditions, and how significant this different performance is under specific circumstances (e.g., how much would the difference in performance in actual use make on the consumer's annual fuel bill); (4) whether accepted test methods are available to measure *in situ* performance (and the identity of specific test methods); (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. Among other things, comments are requested to include data such as consumer research that demonstrate whether disclosures of *in situ* performance would be meaningful and understandable to consumers.

## 2. Performance of Building System Components That Include Insulation

### Comments

Four manufacturers of structural insulation panels (building systems products that include insulation as a major component)<sup>27</sup> and a trade association representing such manufacturers<sup>28</sup> supported requiring the thermal efficiency testing of insulation systems, rather than testing only individual insulation products. These comments asserted that the Structural Insulated Panel ("SIP") industry is penalized by reporting R-values of the insulation components as the measure of the thermal efficiency of panel system because such R-values do not adequately represent the energy efficiency and thermal effectiveness of the panel systems in comparison to insulated panels may appear to have the same total R-value as some fiberglass batts used in stick construction, "[in a typical installation, using EPS foam in a structural insulated panel, the EPS panel outperforms [a] fiberglass batt by 20%."

Three of the manufacturers<sup>29</sup> and the trade association, however, apparently

recognized that additional research and development would be necessary before the Commission could require the testing and disclosure of systems performance values. These comments recommended that the Commission, along with several other federal agencies, work with industry to develop consensus testing procedures to consider factors such as air infiltration, thermal bridging, and moisture effects on the performance of building systems, and provide resources for testing and evaluation of the thermal performance and energy efficiency of construction systems.

### Discussion

The Rule covers home insulation products, including products made up of home insulation and other components (such as structural insulation panels) when they are marketed primarily to slow down the flow of heat. These comments appear to be concerned primarily that the Rule may penalize them by requiring that they disclose the R-value of the insulation component of their panels, instead of the thermal performance of their panels compared to the use of competing home insulation products in other types of building construction. Although the Rule requires that those who market home insulation test and disclose the R-value of their insulation, it does not restrict sellers from providing additional information about how their products perform in actual use, if they are able to substantiate their claims. The comments acknowledge that additional research would be required to develop the procedures necessary to implement a requirement that sellers include in their R-value disclosures information about how their products perform in various types of construction, which would depend on multiple variables. Even if such procedures were developed, as a practical matter, it might be extremely difficult, and perhaps impossible, to draft testing and disclosure requirements that could take such variables into account in a manner that would be meaningful to consumers, and where the benefits (e.g., better information for consumers) outweighed the additional costs (e.g. for additional testing and disclosures) that would be imposed.

Accordingly, while the commission acknowledges the concerns underlying these comments, it has determined not to propose amending the Rule at this time to require the disclosure of insulation performance based on testing of home insulation products in different types of applications. The Commission

<sup>27</sup> Porter, #03; BASF, #21; Insulspan, #33; Fischer Sips, #36.

<sup>28</sup> SIPA, #11.

<sup>29</sup> BASF, #21; Insulspan, #33; FischerSips, #36.

encourages interested parties to pursue the additional testing and research that support a system-type disclosure format, and the Commission's staff is available to provide advice about the type of documentation that would be necessary for the Commission to propose formal testing and disclosure requirements that include these applications.

### C. Disclosing R-values that Account for Factors Affecting R-value

The comments described in this section addressed issuers relating to the Rule's R-value test specimen preparation requirements for specific types and forms of home insulation products. All home insulation products are covered by the Rule, regardless of whether they are specifically referred to in the test specimen preparation requirements or other provisions of the Rule. That is, they must be tested for R-value under the test procedures specified in section 460.5 of the Rule and the R-value results of those tests must be disclosed to consumers. In some instances the Rule specifies how test specimens must be prepared for R-value tests. In other instances it does not, either because the Commission determined it was not necessary to specify R-value test specimen preparation requirements, or because those products were not being sold when the Commission conducted the original rulemaking. These comments suggested adopting updated test specimen preparation requirements or specifying test specimen preparation requirements not currently required by the Rule.<sup>30</sup>

#### 1. Aging

##### a. Cellular Plastics Insulations

Certain types of cellular plastics insulations (polyurethane, polyisocyanurate, extruded polystyrene

<sup>30</sup> In some instances, comments suggested that a specific test specimen preparation procedure, although appropriate for the most products of a certain type and form, might not be appropriate for a specific product, for example, a loose-fill cellulose insulation product with a lower than normal initial density. In such instances, these comments suggested that use of *in situ* data to determine test specimen preparation might be preferable to the specific procedure designated in the Rule. Although the Commission is not proposing to amend specific test specimen preparation requirements in the Rule to include such a provision, manufacturers may file petitions for exemption from the Rule's test specimen preparation requirements under section 18(g) of the FTC Act, 15 U.S.C. 57a(g). Petitioners should submit evidence substantiating why the test specimen preparation procedure required by the Rule is not appropriate for a particular product and why an alternative procedure or method would be appropriate. The Commission will determine whether to grant an exemption based on the petition, substantiating evidence submitted with the petition, and public comments.

boardstock insulations) are manufactured in a process that results in a gas other than normal air being incorporated into the voids in the products. This gives the product an initial R-value higher than it would have if it contained normal air (as do other types of insulations). A chemical process, known as aging, causes the R-value of these insulations to decrease over time as the gas is replaced by normal air. 44 FR at 50219-20. The length of this aging process, which may continue over several years, depends on whether the product is faced or unfaced, the permeability of the facing, how well the facing adheres to the product, and other factors.

The Rule addresses this aging process by requiring that R-value tests be performed on specimens that "fully reflect the effect of aging on the product's R-value." Section 460.5(a)(1) of the Rule accepts the use of the "accelerated aging" procedure in General Services Administration ("GSA") purchase Specification HH-I-530A (which was in effect at the time the Commission promulgated the Rule) as a permissible "safe harbor" procedure, but also allows manufacturers to use "another reliable procedure." 44 FR at 50227-28. The "accelerated" procedure was designed to age these insulations in a shorter period than they would age under normal usage conditions. Under the "accelerated aging" method in the GSA specification, test specimens are aged for 90 days at 140 °F dry heat.

GSA amended its specification in 1982 to allow the use of an optional aging procedure (in addition to the "accelerated" method) under which test specimens are aged for six months at 73 °F± 4 °F and 50 percent ±5 percent relative humidity (with air circulation to expose all surfaces to the surrounding environmental conditions). An industry group, the Roof Insulation Committee of the Thermal Insulation Manufacturers Association ("RIC/TIMA"), specified the use of similar conditions in a technical bulletin it adopted at about the same time. In response to adoption of the alternative aging procedure by GSA and RIC/TIMA, the Commission's staff advised home insulation sellers that the alternative procedure appeared to be reliable and could be used to age cellular plastics insulations. The staff cautioned, however, the manufacturers of insulations faced with materials that significantly retard aging may need to age test specimens for a longer period of time, and that the staff would consider whether the alternative procedure was

acceptable for specific products on a case-by-case basis.<sup>31</sup>

### Comments Regarding Which Aging Procedures Should Be Required

Ten comments addressed how the Rule should treat the reduction in R-values that occurs when cellular plastics insulation products age.<sup>32</sup> Two recommended requiring the use of aging procedures in current ASTM specifications; one recommended requiring the use of a different method being developed by ASTM; and one association (representing 37 manufacturers) and two manufacturers appear to question the accuracy of current aging procedures in determining long-term performance.

Celotex and PIMA<sup>33</sup> recommended deleting the reference to the aging procedures in former GSA Specification HH-I-530A and instead requiring the use of the aging procedures in ASTM C 1289-95 (for faced polyisocyanurate and faced polyurethane),<sup>34</sup> ASTM C 591-85 (for unfaced polyisocyanurate and unfaced polyurethane),<sup>35</sup> and ASTM C 578-92 (for polystyrene).<sup>36</sup> The aging procedures in these ASTM specifications are essentially the same as the optional procedures contained in the revised GSA specification, although ASTM C 591-94 specifies that aging must be conducted according to the 180-day procedure.

Dr. Wilkes, for ORNL, stated that the Rule's aging requirement should be improved and modified to account for technological changes. He reported that ASTM was developing a new method of determining the aged R-value of unfaced cellular plastics board stock insulations and those with permeable facings based on R-value tests of thin samples sliced from the center of the boards (which ASTM has now adopted as ASTM C 1303-95).<sup>37</sup> Under this method, a thin

<sup>31</sup> See, e.g., staff opinion letter dated May 5, 1983, to Manville Corporation. GSA thereafter rescinded its specification (along with other insulation specifications) and now requires that insulations purchased by the federal government comply with ASTM insulation material specifications.

<sup>32</sup> Plymouth, #01, at 1; Big Sky, #05, at 1; Anderson, #08, at 2-3; EPSMA, #13, at 1; Western, #14, at 1-2; NAIMA, #24, at 2; Celotex, #25, at 4; ORNL/Wilkes, #29, at 3-4; PIMA, #30, at 5-6; AFM, #35, at 1.

<sup>33</sup> Celotex, #25, at 4; PIMA, #30, at 5-6.

<sup>34</sup> Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board ("ASTM C 1289-95").

<sup>35</sup> Standard Specification for Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation ("ASTM C 591-94"). This is the current version of the specification cited by Celotex and PIMA.

<sup>36</sup> Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation ("ASTM C 578-92").

<sup>37</sup> Standard Test Method for Estimating the Long-Term Change in the Thermal Resistance of Unfaced

test specimen is sliced from close to the center of the insulation board. R-value measurements are taken over time, normally a 180-day period, and the test specimen is kept in an environmental chamber when R-value tests are not being conducted. The resulting R-values over time are converted into an average value according to a specific mathematical formula. Dr. Wilkes recommended that the Commission adopt this ASTM method as the required procedure for deriving aged R-values for these insulation products.

Dr. Wilkes asserted that a satisfactory aging method for these boardstock insulations with impermeable facers (e.g., aluminum) has not yet been developed. He recommended that the Rule state this fact and require "direct" aging of products with impermeable facers (i.e., aging over time of samples as they are produced—at full thickness and with facers attached). Finally, Dr. Wilkes recommended that the Commission delete the phrase "or another reliable procedure" because of its lack of specificity.<sup>38</sup>

AMF, for itself and its 37 manufacturing partners, stated that the reporting of different R-values for insulations that use gases, and that are known to lose R-value over time as those gases diffuse, has frustrated the original objective of the Rule to provide a "level playing field."<sup>39</sup> Plymouth Foam Products complained that "[s]ome [cellular plastics] foam insulation manufacturers are allowed to represent their products with installed R-values of as high as eight per inch, when, in fact, that value will reduce substantially over the life of the product/structure."<sup>40</sup> These comments recommended that the Rule require testing and disclosure of R-values that more accurately reflect the effect of aging on the R-value of cellular plastics insulation products.

Big Sky and Western contended that the practice of aging a test specimen for six months, even at an elevated temperature, does not provide a true picture of the R-value a consumer can expect over the full life of the product.<sup>41</sup>

Rigid Closed Cell Plastic Foams by Slicing and Scaling Under Controlled Laboratory Conditions ("ASTM C 1303-95").

<sup>38</sup> ORNL/Wilkes, #29, at 3-4.

<sup>39</sup> AFM, #38, at 1.

<sup>40</sup> Plymouth, #01, at 1.

<sup>41</sup> Big Sky, #05 (many manufacturers advertise what they call an aged R-value, when in fact it is only an R-value for insulation aged for six months at elevated temperatures; this R-value is not a true indication of the in-service R-value, which can drop over 30% within three years); Western, #14, at 1-2 (because polyisocyanurate insulation has been sold based on R-values derived after six months of aging under RIC/TIMA 281 or PIMA 100, consumers have been duped into believing they are

Big Sky suggested three options: (1) A six-month accelerated aging process, with an additional 18-month hold on the test specimens before they are tested for R-value; (2) accelerated aging for 18 months; or (3) holding the test specimens for three years. Western suggested that the Commission adopt an accelerated aging test either from ASTM methods or the Corps of Engineers System.

#### *Discussion Regarding Which Aging Procedures Should Be Required*

Requiring manufacturers to age their insulation products for several years before being able to test and market them would impose a significant burden. Instead, the Rule allows the use of the GSA "accelerated aging" procedure, or another reliable procedure. Because some of the comments question whether the GSA accelerated aging procedure or the procedures in ASTM specifications are adequate for all types of cellular plastics insulation products (particularly those with less permeable facers), the Commission solicits comments regarding the length of time over which specific types and forms of cellular plastics insulations age (including both unfaced products and those with different kinds of facings); the effect of the aging process on specific types and forms of cellular plastics insulations (i.e., the overall reduction of R-value over time); the accuracy of different aging procedures to reflect long-term aging of specific types and forms of cellular plastics insulation products; which aging procedures the Commission should require for which types of cellular plastics insulation products; the burdens that would be imposed on manufacturers and other sellers by requiring the use of specific aging procedures; and how the Commission should deal with products for which adequate aging procedures do not currently exist (e.g., those with relatively non-permeable facings).

#### *Comments Regarding Which Cellular Plastics Insulations Should Be Aged for R-value Testing*

NAIMA recommended requiring R-value testing on aged samples of "other foam plastic insulation" products (in addition to the types currently enumerated) and recordkeeping of the age of the test specimen. NAIMA asserted that present and future foam insulations not currently covered by the

purchasing insulation that will deliver an R-value of 7.2 per inch for the duration of its service; although the true aged R-value of polyisocyanurate cannot be agreed upon, 5.56 per inch is often used and would be a more realistic figure).

aging requirement should be tested and labeled to reflect the effects of aging, but did not submit data to demonstrate whether other existing cellular plastics, or foam, insulations are subject to aging. According to NAIMA, the requirement would impose no extra testing or labeling burdens on manufacturers of insulations that are not subject to aging.<sup>42</sup>

#### *Discussion Regarding Which Cellular Plastics Insulations Should Be Aged for R-value Testing*

The Commission required R-value testing of aged specimens only for extruded polystyrene, polyurethane, and polyisocyanurate insulations because these were the only types of insulations discussed during the rulemaking proceeding that included blowing agents subject to the aging process. The Commission agrees that manufacturers of additional types of cellular plastics, or foam, insulations that are subject to the aging process should be required to test aged specimens and disclose aged R-values, and to maintain testing records identifying the aging procedure used. The Commission, therefore, solicits comments on what additional types or forms of insulations are subject to the aging process.

#### **b. Reflective Insulations**

##### *Comments*

NAIMA recommended that the Commission require that reflective (aluminum foil) insulation products be tested for emissivity and R-value "using samples that fully reflect the effect of aging" on the product's emissivity and R-value. NAIMA asserted that thermal performance claims for reflective insulations, as for cellular plastics insulations, should reflect the effects of aging (in this case, the accumulation of dust or corrosion of the foil). NAIMA did not submit evidence that dusting or corrosion is a problem that degrades the R-value of reflective insulations in actual applications, and did not suggest a specific test method or procedure that should be used to determine the effects of this type of aging on reflective insulations.<sup>43</sup>

##### *Discussion*

The Commission believes that claims for all types of home insulation products should take into account factors that affect the products' thermal performance. The Commission, therefore, invites interested parties to comment on whether dusting or

<sup>42</sup> NAIMA, #24, at 2, 4.

<sup>43</sup> Id. at 3.

corrosion of reflective insulations in actual applications is a problem resulting in lower R-values than claimed, the extent of any degradation of R-value, and how the effect of dusting or corrosion on R-value could most accurately be determined.

## 2. Settling

### a. Loose-fill and Stabilized Insulations in Attics

In the original rulemaking proceeding, the Commission determined that all dry-applied loose-fill insulation products tend to settle after being installed in open (or unconfined) areas such as attics. Settling lowers the product's thickness, increases its density, and affects its total R-value.<sup>44</sup> The amount of settling depends on several factors, including the raw materials and manufacturing process used, and the installer's application techniques (which affect the insulation's initial thickness and density).

To ensure that claims made to consumers are based on long-term thickness and density after settling, the Rule requires that the R-value of each dry-applied loose-fill home insulation product for these applications be determined at its "settled density." The Rule requires that manufacturers of dry-applied loose-fill cellulose insulation for attic applications test and disclose the R-value (as well as coverage area and related information) at the long-term, settled density determined according to paragraph 8 of ASTM C 739-91, commonly referred to as the "Blower Cyclone Shaker" ("BCS") test.<sup>45</sup> Because a consensus-based test procedure had not been adopted for determining the long-term, settled density of dry-applied loose-fill mineral-fiber insulation for this type of application, the Rule does not specify the procedure for determining the density of the R-value test specimen, but it requires that R-values claimed to consumers be based on long-term thickness and density after settling.<sup>46</sup>

<sup>44</sup> Settling of loose-fill cellulose insulation reduces the product's total R-value, often decreasing it proportionate to the amount of settling. Settling of loose-fill mineral fiber insulation also affects the product's total R-value, but the reduction in total R-value may be less than the reduction in thickness. E.g., ORNL/Yarbrough, #28, at References 1, 2; ORNL/Wilkes, #29, at References 9, 10.

<sup>45</sup> Standard Specification for Cellulosic Fiber (Wood-Base) Loose-Fill Thermal Insulation ("ASTM C 739-91").

<sup>46</sup> At the time the Commission promulgated the Rule, GSA had proposed adopting a settled density test procedure for loose-fill mineral fiber insulation products similar to the one it had adopted for loose-fill cellulose insulation products. Mineral fiber manufacturers contended, however, that they took settling into account in their coverage charts, and

Since the Commission promulgated the Rule, new forms of loose-fill-type home insulation products have been introduced for use in attic applications, including "stabilized" cellulose. "Stabilized" cellulose refers to a form of loose-fill cellulose insulation that contains a glue binder and is applied on attic floors with a small amount of liquid. Application of the insulation with the glue binder and liquid purportedly results in lower-density cellulose insulations that do not settle like dry-applied loose-fill cellulose insulations. The Rule does not currently specify a procedure for determining the long-term, settled density of stabilized cellulose insulation.

### Comments

**Dry-applied Loose-Fill Cellulose.** Dr. Wilkes, for ORNL, stated that settling decreases the R-value obtained when a loose-fill insulation product is applied, although limited information exists about the amount of settling that occurs. Dr. Wilkes supported use of the BCS test procedures to determine the settled density of dry-applied loose-fill cellulose insulation. He suggested that the BCS procedure may be inappropriate for new products such as those with initial densities as low as 1.0 to 1.5 pounds per cubic foot. For such products, Dr. Wilkes stated that *in situ* data would be more appropriate than the BCS procedure in determining long-term, settled density, and recommended that the Commission permit manufacturers to submit *in-situ* data to demonstrate the actual settled density of their products.<sup>47</sup>

**Dry-applied Loose-Fill Mineral Fiber.** Eleven comments addressed how the settled density of dry-applied loose-fill mineral fiber insulation products in open attic applications should be determined for R-value testing.<sup>48</sup> Regal contended that the Rule's objective of creating a level playing field has been compromised because of the failure of GSA, ASTM, and the mineral fiber industry to develop a uniform standard for determining the settled density of

that if their insulations were installed according to their coverage charts, consumers would receive the R-values they claimed. The Commission imposed a general requirement that R-values of dry-applied loose-fill mineral fiber insulations be based on tests that take the adverse effects of settling into account, but did not specify how the settled density was to be determined. 44 FR at 50228. GSA never adopted a procedure for determining the settled density of mineral fiber insulations.

<sup>47</sup> ORNL/Wilkes, #29, at 4.

<sup>48</sup> Regal, #16, at 1-2; England, #18, at 3; CIMA, #19, at 2-3; GreenStone/Tranmer, #20, at 2-3; Hamilton, #22, at 3; NAIMA, #24, at 2; TN Tech/Yarbrough, #26, at 4-5; ORNL/Wilkes, #29, at 4; GreenStone/Smith, #32, at 2; Clayville, #34, at 1-2; Tascon, #35, at 1.

dry-applied loose-fill mineral fiber insulations.<sup>49</sup> Other comments agreed.<sup>50</sup> Three stated that this uneven playing field (*i.e.*, requiring cellulose manufacturers, but not mineral fiber manufacturers, to use a specific test procedure) imposes a competitive disadvantage for the cellulose industry.<sup>51</sup> CIMA, for example, stated that the BCS test typically produces 30% settling for loose-fill cellulose, while long-term studies of actual installations rarely find cellulose settling as much as 20%. CIMA asserted that the Rule places the cellulose industry at a competitive disadvantage of as much as 10% to 15% compared to loose-fill fiberglass, and that, if this discrimination has affected the cellulose market share by as little as 5%, it has resulted in an annual revenue loss of approximately \$50 million for cellulose producers.

Four comments stated this uneven treatment is unfair to consumers.<sup>52</sup> GreenStone/Smith, for example, stated that mineral fiber manufacturers have not developed a standard test method to measure the settling of loose-fill mineral fiber insulations, but instead claim that if their products are installed at the density they recommend, the amount of settling will be minimal (less than 5%). He asserted that the mineral fiber manufacturers construct coverage charts at this density and represent to consumers that no settling is expected. According to GreenStone/Smith, installers who desire to minimize costs can install loose-fill mineral fiber insulations at less than the density claimed by manufacturers (and at a lower total R-value than claimed), without consumers' knowledge, and thereby save time and material and defraud consumers of the energy savings they anticipate.

As a short-term solution, five comments recommended that the Commission impose a settlement factor of up to 10% or more for dry-applied loose-fill mineral insulation products, pending the adoption of a suitable industry standard to address how much these products settle.<sup>53</sup> Dr. Yarbrough,

<sup>49</sup> Regal, #16, at 1-2.

<sup>50</sup> England, #18, at 3 1-2; CIMA, #19, at 2-3; GreenStone/Tranmer, #20, at 2-3; Hamilton, #22, at 3; GreenStone/Smith, #32, at 2; Clayville, #34, at 1-2; Tascon, #35, at 1.

<sup>51</sup> CIMA, #19, at 2-3; GreenStone/Tranmer, #20, at 2-3; Clayville, #34, at 1-2.

<sup>52</sup> GreenStone/Tranmer, #20, at 2-3; Hamilton, #22, at 3; GreenStone/Smith, #32, at 2; Clayville, #34, at 1-2.

<sup>53</sup> Regal, #16, at 1-2; England, #18, at 3; CIMA, #19, at 2-3 (impute 10% settling for all loose-fill insulations for which there is no standard settled density methodology published by a recognized, independent materials-standards organization);

for TN Tech., and Dr. Wilkes, for ORNL, suggested that, until a uniform test procedure is developed, manufacturers should determine settled density based on *in situ* data.<sup>54</sup>

**Stablized Cellulose.** Dr. Wilkes, for ORNL,<sup>55</sup> and Dr. Yarbrough, for TN Tech.,<sup>56</sup> stated that the BCS test is inappropriate for determining the settled density of stabilized cellulose insulation. Dr. Yarbrough explained that "stabilized" cellulose insulation contains a binder, or other means, for bonding particles in the insulation to reduce settling, and that the fan used in the BCS test breaks the bond. Dr. Wilkes and Dr. Yarbrough recommended allowing the use of *in situ* observations of the degree of settling to establish the settled density at which the R-value of a stabilized cellulose product must be determined. Dr. Yarbrough stated that a methodology for obtaining *in situ* data is available.<sup>57</sup> He explained that an ASTM task group is working on a material specification for stabilized cellulose insulation that he expects will include a method for determining settled density, and recommended that the Commission consider requiring the use of the ASTM standard when it has been adopted by ASTM.<sup>58</sup>

NAIMA recommended requiring that R-value tests on stabilized cellulose insulations be "done on samples that fully reflect the effect of settling on the product's R-value." NAIMA stated that ASTM C 1149<sup>59</sup> has been modified to include products containing an adhesive that is mixed with water during installation and is intended for use in attic applications. NAIMA stated that a task group is developing a method to determine and quantify the amount of settling.<sup>60</sup>

#### Discussion

**Dry-applied Loose-fill Cellulose.** Although the rule requires manufacturers of dry-applied loose-fill cellulose to determine the R-values and

coverage of their products at the settled density determined according to the BCS procedure, manufacturers who can demonstrate that the BCS procedure is inappropriate for their products can petition the Commission for an exemption that would allow them to determine the settled density of their products according to a more appropriate methods. See note 30, above.

**Dry-Applied Loose-fill Mineral Fiber.** The Rule specifies the procedures to be used in determining the settled density only for cellulosic, and not mineral fiber, insulation products. When the Commission promulgated the Rule in 1979, it expected that GSA soon would adopt a specific test procedure for determining the settled density of dry-applied loose-fill mineral fiber insulation products. 44 FR at 50228, 50239 n.239. GSA did not do so, and now accepts the use of ASTM standards, which do not specify procedures for determining the settled density of dry-applied loose-fill mineral fiber insulations.

Reports of studies conducted by Oak Ridge National Laboratory during the 1980s demonstrate that certain loose-fill mineral fiber insulation products can settle following installation, resulting in a reduction of R-value.<sup>61</sup> The results differed in the amount of settling, and the effect of settling on the R-values of the specific insulation products studied, depending on the type of mineral fiber insulations studied (fiberglass versus rock wool products) due to differences in density.

The Commission agrees that it would be preferable to specify a uniform procedure for determining the long-term, settled density of dry-applied loose-fill mineral fiber insulation products. Unfortunately, none of the comments suggested a specific procedure that the Commission could adopt at this time. In addition, the comments that suggested requiring an across-the-board settlement factor of 10% have not submitted documentation that would justify the Commission imposing it on all dry-applied loose-fill mineral fiber insulation products.

The Commission, therefore, solicits comments on specific reliable and uniform procedures that would be appropriate for determining the long-term, settled density of dry-applied loose-fill mineral fiber insulation products, and the submission of data to demonstrate that those procedures will result in uniform and accurate results. For example, the Commission requests

any data that demonstrate that any of the following, currently available test procedures, or others, would produce accurate and reliable, long-term settled density results for mineral fiber insulation products in attic applications: the BCS test procedure in ASTM C 739-91 (which currently is required for dry-applied, loose-fill cellulose insulation products); the "Canadian drop box procedure," which previously was proposed by GSA for loose-fill mineral fiber insulations under Federal Specification HH-I-1030B;<sup>62</sup> the British Standard Vibration Test; and the procedure developed in Scandinavia by Dr. Svennerstedt. In the meantime, the Commission will continue to examine the data specific manufacturers use to substantiate their R-value, long-term settled density, and coverage claims.

**Stabilized Cellulose.** Because of the manner in which stabilized cellulose insulation is installed, the Commission agrees that the BCS test procedure may not be appropriate for determining its long-term, settled density. Further, the Commission does not believe that the procedure for determining density in ASTM C 1149, which NAIMA suggested, is the appropriate measure of the long-term, settled density of stabilized cellulose insulations installed in attic applications. ASTM C 1149 is designed for insulations sprayed onto walls (most often being applied to metal walls in commercial buildings, where they are left exposed, without being covered by an internal wall), and requires that these insulations be able to support themselves in that type of application. The settling characteristics of stabilized cellulose insulations in attic applications are different from those of self-supported insulations sprayed onto walls. ASTM has not yet adopted a specific method for determining the long-term density of stabilized cellulose insulation for attic applications. When ASTM, or others, adopt an appropriate procedure, the Commission will consider whether to require its use. In the meantime, under section 5 of the FTC Act, manufacturers must have a reasonable basis for the density at which they conduct the R-value tests required by the Rule and make R-value claims to consumers.

**Loose-fill and Stabilized Insulations Used in Manufactured Housing Attics.** No comments addressed whether the procedures currently used to determine the settled density of dry-applied loose-fill insulations or stabilized insulations when they are used in attics of site-built homes are appropriate for determining

GreenStone/Tranmer, #20, at 2 (impute 5% to 10% settling); GreenStone/Smith, #32, at 2-3 (absent a standard test method, require disclosures based on at least 10% settling; if a product has been determined not to settle, require disclosure of that fact as an assurance to consumers); Tascon, #35, at 1 (impute settlement not less than 10% if a technically supportable method of determining settlement has not been established within a reasonable time, e.g., 5 years).

<sup>54</sup> TN Tech/Yarbrough, #26, at 4-5; ORNL/Wilkes, #29, at 4.

<sup>55</sup> ORNL/Wilkes, #29, at 3.

<sup>56</sup> TN Tech/Yarbrough, #26, at 2.

<sup>57</sup> *Id.* at 2, references 1, 2.

<sup>58</sup> *Id.* at 3.

<sup>59</sup> ASTM C 1149-90: Standard Specification for Self-Supported Spray Applied Cellulosic Thermal/Acoustical Insulation ("ASTM C 1149").

<sup>60</sup> NAIMA, #24, at 2-3.

<sup>61</sup> ORNL/Yarbrough, #28, at Refs. 1, 2; ORNL/Wilkes, #29, at Refs. 9, 10.

<sup>62</sup> See 44 FR at 50228, 50239 n.239.

their settled density when they are used in attics of manufactured housing. Industry members have raised this question separately, however, with the Commission's staff. At issue is whether these insulations, which are installed in attic assemblies in a factory and then transported to the site where the manufactured home will be located, settle more, or differently, than those used in site-built homes because of additional vibrations and other factors during transportation. The Commission solicits comments regarding the extent of settling of dry-applied loose-fill insulations and stabilized insulations when they are used in attics of manufactured housing, the density at which the R-value of these insulations should be determined for use in attics of manufactured housing, and how that density should be determined.

#### **b. Loose-fill and Self-supported Insulations in Walls**

Dry-applied loose-fill insulations and spray-applied, self, supported insulations can be installed in walls in residential applications. Dry-applied loose-fill insulations normally can only be applied to existing wall cavities (primarily in retrofit applications). Spray-applied, self-supported insulations can be applied to open wall cavities before installation of internal walls.

Dry-applied loose-fill insulations may settle when blown into a confined area, such as an enclosed wall cavity, leaving a gap at the top of the wall cavity if they are not sufficiently compressed during installation. Manufacturers who claim an R-value for a dry-applied loose-fill insulation must disclose the R-value at the applied density, determined according to the R-value test procedures specified in the Rule. The Rule, however, does not specify how manufacturers must determine that density because there was no standard procedure for measuring the applied density in wall applications for all products at the time the Commission promulgated the Rule. Because dry-applied loose-fill insulations installed in closed wall cavities must be compressed during application to ensure that they do not settle, the applied density in wall applications is likely to be greater than the settled density of the product when it is installed in an open attic.

Self-supported, spray-applied insulations, mixed with water and adhesives (also referred to as "wet-spray" insulations), are installed pneumatically on-site by professional installers. They may be made of either cellulose or mineral fiber. When

applied, this form of insulation requires no support other than the insulation itself or the substrate to which it is attached. These products most often are used in walls in commercial applications, where they may be left exposed after they are installed. They are rarely used in residences, primarily because this application requires the use of more insulation material for a given thickness (*i.e.* the insulation is installed at a higher density and cost), often without any increase in total R-value, and sometimes at a reduced R-value. They are not used in attics because of their additional weight (and cost). Because these products are applied at a greater density than either dry-applied loose-fill or stabilized insulations, they are not likely to settle. Although this form of insulation was not discussed during the original rulemaking proceeding and the Rule does not specify how R-value these specimens must be prepared, it is covered by the Rule if it is sold for use in the residential market. Because the density at which these insulations are applied affects their R-values, the Commission's staff has advised industry members that they should prepare test specimens according to the manufacturer's installation instructions, using equipment, materials, and procedures representative of the manner in which the insulation is applied in the field.

#### *Comments Regarding the Use of Dry-applied Loose-fill Insulations in Wall Cavities*

Two comments recommended requiring the disclosure of R-values and related information for loose-fill insulations intended in walls or other enclosed cavities. NAIMA recommended requiring that coverage charts for these products include R-values maximum net coverage area, and minimum weight per square foot for the thicknesses of common cavities (*e.g.* 3½"). NAIMA asserted that separate disclosures for installations of these insulation products in enclosed cavities is necessary to provide guidance about the proper amount of material that must be installed.<sup>63</sup> Mr. Smith, for GreenStone, agreed and suggested requiring disclosure of a coverage chart for "Gross Coverage," for cavities using 2x4 and 2x6 on 16" center construction. He recommended requiring the disclosure of the density at which the loose-fill insulation should be installed, along with a statement that applications below this density may be subject to settling and may create gaps at the top of or within wall cavities that may

significantly reduce the insulating value of the product. Lastly, he stated that the R-value for each of the wall thicknesses claimed must be determined at the applied density the manufacturer recommends.<sup>64</sup>

#### *Discussion Regarding the Use of Dry-applied Loose-fill Insulations in Wall Cavities*

The Commission agrees that specific requirements for determining the appropriate density for the R-value test specimen and for disclosures on coverage charts for applications in enclosed wall cavities would be appropriate and desirable. GreenStone's suggestion of requiring a statement of "applied density" could provide helpful information to installers in determining whether they have installed the requisite amount of insulation material, but it does not address how that density should be determined. The Commission, therefore, solicits comments on whether there are reliable procedures that could be used to determine the density of dry-applied loose-fill insulations when installed in enclosed wall cavities, and the specific disclosures that should be required (*e.g.*, how coverage area for enclosed wall cavities should be described).

#### *Comments Regarding the Use of Self-Supported Insulations in Wall Cavities*

ECI recommended adopting the test specimen preparation procedures in ASTM C 1149 when testing insulations that are sprayed into wall cavities.<sup>65</sup> England recommended requiring use of either HUD UM-80<sup>66</sup> or ASTM C 1149, both of which apply to spray-applied cellulose insulation, to ensure that R-value and related information is accurate.<sup>67</sup>

#### *Discussion Regarding the Use of Self-supported Insulations in Wall Cavities*

The procedures in paragraph 5.1 of ASTM C 1149-90 and in paragraph 9.1.1 of HUD UM-80, which require the R-value test specimens be prepared using the manufacturer's recommended equipment and procedures and at the manufacturer's maximum recommended thickness, appear to be appropriate procedures for preparing R-value test specimens of self-supported, spray-applied cellulose insulation products.

<sup>64</sup> GreenStone/Smith, #32, at 3.

<sup>65</sup> ECI, #23, at 1.

<sup>66</sup> U.S. Department of Housing and Urban Development Materials Bulletin No. 80 ("HUD UM-80"), dated October 31, 1979. This specification includes additional requirements, *e.g.*, the surface to which the specimen is to be applied, and post-preparation conditioning.

<sup>67</sup> England, #18, at 2-3.

<sup>63</sup> NAIMA, #24, at 5.

Accordingly, the Commission proposes amending the Rule to require preparation of R-value test specimens of self-supported, spray-applied cellulose insulation products according to either of these specifications. The Commission solicits public comments regarding the accuracy and reliability of the two procedures, whether the Commission should allow use of either procedure or only one, how the Commission should define specifically the products to which the procedures apply, and whether the same procedures (or others) should be required for other types of spray-applied insulations (e.g., mineral fiber insulations) that are used in residential applications.

*Discussion Regarding the Use of Loose-fill Insulations and Self-supported Insulations in Wall Cavities of Manufactured Housing*

No comment addressed whether the procedures currently used to determine the settled density of dry-applied loose-fill insulations or self-supported insulations when they are used in wall cavities of site-built homes are appropriate for determining their settled density when they are used in wall cavities of manufactured housing. Industry members have raised this question separately, however, with the Commission's staff. At issue is whether the settling of these insulations, which are installed in wall assemblies in a factory and then transported to the site where the manufactured home will be located, settled more, or differently, than those used in site-built homes because of additional vibrations and other factors during transportation. The Commission solicits comments regarding the extent of settling of dry-applied loose-fill insulations and self-supported insulations when they are used in wall cavities of manufactured housing, the density at which the R-value of these insulations should be determined for use in wall cavities of manufactured housing, and how that density should be determined.

### 3. Density Variations

The Rule's testing and labeling requirements assume that the long-term settled density of a dry-applied loose-fill insulation product does not change with variations in thickness. The Rule, therefore, simply requires that manufacturers of dry-applied loose-fill cellulose insulation determine the settled density of each product according to the BCS test procedure and test it for R-value at that density, and that manufacturers of dry-applied loose-fill mineral fiber insulation determine the R-value of each product on samples

that fully reflect the effect of settling on R-value. As long as the R-value test has been conducted at that density and at the product's "representative thickness,"<sup>68</sup> the manufacturer can construct the required coverage chart for various total R-value levels based on the R-value result at the tested density.

#### Comments

Ivan Smith, for GreenStone, recommended revising section 460.6 of the Rule to require testing of loose-fill insulations at each thickness shown on a label unless there is a limitation caused by the physical constraints of the test equipment. Mr. Smith believes it is likely that density will be different at each different thickness of loose-fill material, and that this variation of density potentially affects the thickness necessary to obtain the claimed total R-value. He contended that this requirement would not result in a substantial expense to the manufacturer.<sup>69</sup>

#### Discussion

The Commission cannot determine whether it would be appropriate to propose amending the Rule as Mr. Smith recommended without specific data to demonstrate whether or how much the density of particular types of loose-fill insulations varies with differences in thickness. The Commission solicits comments and data, therefore, on whether, and how much, the density of specific loose-fill insulations varies with thickness, the effect of any such variations on the total R-value at different thickness, and how the Commission should amend the Rule to ensure that R-values and related claims for loose-fill insulation products are accurate.

### 4. Installation in Closed Cavities of Variable Thickness

#### Comments

Dr. Yarbrough, for TN Tech, stated that the evaluation of the thermal performance of insulations used in attics of manufactured housing

<sup>68</sup> The mathematical extrapolation of R-value for a mass insulation product from thin-sample tests can be misleading because it fails to recognize that, up to at least some thickness, R-value does not increase linearly with increases in thickness. This is referred to as the "thickness effect." To account for the thickness effect, section 460.6 requires that R-value tests of mass insulations be conducted at the product's "representative thickness," which it defines as the thickness at which the R-value per unit will vary no more than plus or minus two percent with increases in thickness. For thicknesses less than the representative thickness, however, the R-value claimed may be based on testing at the claimed thickness. 44 FR at 50226.

<sup>69</sup> GreenStone/Smith, #32, at 3.

represents a special challenge because, in some cases, the roof cavity (and the insulation installed in it) varies in thickness and density. For example, these roof cavities often slope to the edge of the roof assembly, where the cavity may be only 1½" to 2" thick. Any insulation (whether it is a batt or blanket, dry-applied loose-fill, or stabilized product) installed in such an application can vary in thickness across the cavity, and may be compressed more than normal in the thinnest portions of the cavity. These factors result in different total R-values at different places. Dr. Yarbrough recommended specifying how R-values for such variable thickness and density applications should be calculated, and suggested using a method such as the one he and others have described in a paper published by the American Society of Mechanical Engineers.<sup>70</sup> He stated that the manner in which R-values are expressed for this type of application could affect a major portion of new manufactured homes and could determine whether insulations installed in these applications achieve the total R-values claimed.<sup>71</sup>

#### Discussion

The Commission agrees that it is important to address how R-values should be determined and disclosed to consumers where the insulation varies in thickness and/or density in particular applications, so that R-values claimed to consumers under these circumstances will be accurate and determined according to a uniform standard. The Commission solicits comments, therefore, regarding the method (such as that recommended by Dr. Yarbrough) that should be used to determine and disclose R-values under these circumstances, and how different variables (e.g., thickness, density) should be accounted for in the determination.

### D. Other Testing Requirements

#### 1. Accreditation of Testing Laboratories

#### Comments

The Celotex Corporation recommended requiring that testing laboratories either be accredited by the National Voluntary Laboratory Accreditation Program ("NCLAP"), administered by the U.S. Department of Commerce's National Institute of

<sup>70</sup> D.W. Yarbrough, R.S. Graves, and D.L. McElroy, Effectiveness of Thermal Insulation in Attic Spaces of Manufactured Homes, Collected Papers in Heat Transfer 1988, K.J. Yang, Ed., The American Society of Mechanical Engineers, HTD-Vol. 104 (1988), at 71-80.

<sup>71</sup> TN Tech/Yarbrough, #26, at 4.

Standards and Technology ("NIST"), for the specific test methods listed in the Rule, or by the International Organization for Standardization ("ISO") as an ISO/IEC Guide 25 Testing Laboratory. Further, Celotex stated that accreditation as an ISO/IEC Guide 25 Testing Laboratory provides global acceptance of a laboratory's test results.<sup>72</sup>

#### Discussion

Although accreditation of testing laboratories by a qualified, professional accreditation program generally is useful and important, the Commission is not aware of any significant testing problems with unaccredited laboratories that would justify the Commission's imposing this additional burden under the Rule. Further, to the extent that accreditation of a laboratory provides either domestic or global acceptance of that laboratory's test results, manufacturers and other sellers should already have sufficient incentive to use accredited laboratories, and testing laboratories should have sufficient incentive to seek accreditation, without the Commission imposing an accreditation requirement.

The Rule already includes several interrelated safeguards to ensure testing integrity that make a separate accreditation requirement unnecessary, absent evidence of testing abuse. First, the Rule requires manufacturers to test or have their products tested to substantiate the R-values they claim, and to maintain specific records concerning the testing methods and results. Second, it enables the Commission to analyze the substantiation tests by evaluating the required testing records. Third, it includes a quality control requirement, under which industry members must ensure that the R-value of the insulation they sell is not more than 10% below the R-value they claim. Thus, even if the manufacturer or other covered party has a test result that purports to verify the claimed R-value, the Commission can obtain samples and conduct its own testing to ensure that accurate, properly determined R-values are being disclosed to consumers.

Although the Commission is not proposing to require laboratory accreditation at this time, it solicits comments on the extent to which manufacturers presently use accredited versus nonaccredited labs. In addition, the Commission seeks comments on whether it should require additional recordkeeping to make the records more clearly demonstrate whether the tests have been conducted accurately and in

accordance with the required procedures.

#### 2. Test Temperature Requirements

Several test temperature parameters are involved in R-value testing: (1) The temperature on the cold side of the testing apparatus; (2) the temperature on the hot side of the testing apparatus; (3) the mean (or average) test temperature within the test chamber; and (4) the temperature differential (*i.e.*, the temperature spread between the cold and hot sides). The record in the original rulemaking proceeding indicated that variations in these test parameters affected the ASTM steady-state R-value results for mass insulations and reflective insulations differently.

For mass insulations, the record indicated that R-values decreased as the mean test temperature rose, and that this inverse relationship between R-value and mean test temperature was approximately the same for all mass insulations. On the other hand, the record indicated that variations in the temperature differential between the hot and cold sides did not significantly affect the R-value results. For these reasons and other explained below, the Commission determined the R-value tests of mass insulations should be conducted at a mean test temperature of 75 °F, but that it was not necessary to specify a required test temperature differential for testing mass insulations.

For traditional reflective foil insulations, on the other hand, the record indicated that variations in mean test temperature did not affect the R-value results, but that variations in the temperature differential between the hot and cold sides did affect the R-value results. At least at smaller temperature differentials, the record indicated that there was an inverse relationship between R-value and the temperature differential, as the temperature differential increased, the R-value result went down. The Commission determined, therefore, that it was necessary to specify both the mean test temperature and the temperature differential for R-value testing of reflective insulations.

The R-value of a reflective insulation is related to its emissivity.<sup>73</sup> Based on evidence that single-sheet reflective foil insulation products with a given emissivity installed in an airspace of the same thickness and configuration will have the same R-value, the Commission minimized manufacturers' testing burdens by allowing them to use the R-values for those products listed in a

specific table published by the American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. ("ASHRAE"). Thus, manufacturers of single-sheet reflective insulation products need only to measure the product's emissivity according to a specific ASTM test procedure (or an alternative procedure that provides comparable results)<sup>74</sup> and find the appropriate R-value in the ASHRAE table for that emissivity.<sup>75</sup> The ASHRAE table contained R-values for only certain mean test temperatures and temperature differentials. To ensure that claims were based, to the extent possible, on a standard that would allow comparison on a uniform basis of R-values for single-sheet reflective insulations and mass insulations, the Commission specified that single-sheet reflective insulation manufacturers must use the R-value in the ASHRAE table for a mean test temperature of 50 °F (the table did not include a mean test temperature of 75 °F, so the Commission selected the mean test temperature closest to 75 °F) and a temperature differential of 30 °F.

For multi-sheet reflective foil insulations (used to create multiple airspaces), the record indicated that extrapolation of a total R-value from the ASHRAE R-value for a single airspace was unreliable. 44 FR at 50228. The Commission, therefore, required that R-values be determined through R-value testing according to specific ASTM procedures. So that the results of these tests would be comparable to those for single-sheet insulations and for mass insulations, the Commission determined that the tests must be conducted at a mean test temperature of 75 °F and a temperature differential of 30 °F.

#### a. Mean Temperature

##### Comments

Plymouth Foam Products asserted that a mean test temperature of 40 °F would more accurately represent the climate(s) for the majority of the United

<sup>74</sup> See Part IV.D.5.a.i., *infra*

<sup>75</sup> The values in the table apply only to air spaces of uniform thickness bounded by plane, smooth, parallel surfaces with no leakage of air to or from the space. Further, the table lists only certain emissivities and airspace thicknesses. The Rule specifies that the emissivity must be determined according to ASTM E 408, or another test method that provides comparable results. The R-value of a traditional single-sheet reflective foil insulation product that will be installed in an air space that is not of uniform thickness bounded by plane, smooth, parallel surfaces with no leakage of air to or from the space should be tested according to the Rule's requirements for traditional multi-sheet reflective foil insulations.

<sup>72</sup> Celotex, #25, at 3.

<sup>73</sup> See note 25, *supra*.

Sates than the required 75 °F mean test temperature.<sup>76</sup>

#### Discussion

The Commission addressed this issue when it originally promulgated the Rule.<sup>77</sup> To ensure that R-values claimed to consumers are made on a uniform basis, the Commission required that R-values disclosed to consumers be based on steady-state ASTM R-value tests conducted at a mean temperature of 75 °F. The Commission concluded that 75 °F (which was incorporated in many voluntary industry standards and federal procurement specifications) would be as effective as any other mean temperature in providing a standard mean test temperature for R-value comparison purposes, although it otherwise had not particular advantage over any other temperature. By requiring that R-value testing be conducted at this mean test temperature, the Commission did not intend to specify a mean test temperature that would be representative of any particular geographical region, or particular season or of actual performance conditions. Indeed the Commission concluded that requiring sellers to test and disclose R-values at a mean temperature representative of any specific geographical region, or season of the year, would yield R-value results that would be inappropriate for other regions or seasons. Further, it concluded that requiring sellers to test and disclose R-values separately for different regions of seasons would yield multiple disclosures that could confuse consumers and discourage them from using R-values in making purchasing decisions. Thus, the Commission selected a single mean test temperature to establish a uniform standard for disclosing R-values. Although the Commission received no new information that would indicate that any other single mean test temperature would be preferable to 75 °F, the Commission invites public comments on this issue, along with comments regarding the testing and the disclosure of *in situ* performance information. See also the discussion in Part IV.B.1, above.

#### b. Temperature Differential

##### Comments

One comment recommended amending the Rule to specify the temperature differential. NAIMA recommended requiring not only that R-value tests be preformed at the mean

temperature of 75 °F, but also requiring a test temperature differential of "50 °F ±10 °F." NAIMA explained that the thermal properties of a specimen may change both with mean temperature and with the temperature difference across the test specimen, and that data and information at standard temperatures are therefore necessary for valid comparison of thermal properties. NAIMA stated that ASTM C 1058<sup>78</sup> specifies a temperature difference of 50 °F ±10 °F when conducting tests at a mean temperature of 75 °F according to ASTM test methods C 177, C 236, C 581, and C 1114.<sup>79</sup>

##### Discussion

The Commission agrees that, if current evidence demonstrates that different test temperature differentials affect R-value results, it may be appropriate to consider specifying a test temperature differential in the Rule to ensure the comparability of R-value claims for competing home insulation products. The Commission, therefore, solicits comments on whether, to what extent, and for what types and forms of insulation, variations in the test temperature differential affect R-value results; and what specific test temperature differential(s) the Commission should impose for tests conducted according to each of the R-value test procedures cited in the Rule. See also the discussion in Part IV.B.1, above.

#### 3. Tolerance

##### Comments Regarding Responsibilities of Manufacturers Versus Installers

NAIMA<sup>80</sup> and ICAA<sup>81</sup> proposed limiting application of the Rule's 10% tolerance limit to manufacturers by replacing the words "industry member" with "manufacturer."

##### Discussion Regarding Responsibilities of Manufacturers Versus Installers

The Commission designed the tolerance limit provision to apply to the manufacturer. Strictly speaking, the tolerance does not apply to professional installers or new home sellers. The Rule requires that professional installers and new home sellers apply loose-fill insulations according to the manufacturer's installation instructions, but allows them to rely on the accuracy of the manufacturer's R-value and

installation instructions. Installers and new home sellers therefore have the benefit of the 10% tolerance limit for variances occurring in the manufacturing process. But the tolerance is not intended to allow installers or new home sellers to deviate from the manufacturer's installation instructions. Consequently, the Commission proposes amending the Rule to clarify that the tolerance provision applies solely to claims made by manufacturers.

##### Comments Regarding How the Tolerance Limit Will Be Applied

NAIMA and Dow suggested clarifying the Rule to state more precisely how the tolerance limit would be applied. NAIMA suggested specifically requiring manufacturers to design their products to 100% of the claimed R-value, rather than aiming at the tolerance. NAIMA further recommended that the section require that the R-value of home insulation to be no more than 5% below the listed R-value for the average of four randomly selected samples, and that the R-value of any single sample to be no more than 10% below the listed R-value. NAIMA explained that limiting the tolerance to the average of four samples would make this section of the Rule consistent with current ASTM material standards. Dow asked that the Commission clarify the intent of § 460.8, and suggested the following language to allow some variability in a production lot (rather than simply permitting an R-value of up to 10% below the claimed value):

The mean R-value of sampled specimens of a production lot must meet or exceed the R-Value shown in a label, fact sheet, ad or other promotional material. No individual specimen can have an R-Value more than 10% below the claimed R-Value.<sup>82</sup>

##### Discussion Regarding How the Tolerance Limit Will Be Applied

The tolerance limit provision was designed to give manufacturers the flexibility to use the most effective and least burdensome or costly quality control procedures necessary to maintain each product's R-value (and the density necessary to obtain the claimed R-value) within an acceptable limit. At this time, however, the Commission agrees that it would be appropriate to consider whether the Commission should include in the Rule additional, more specific, guidance about how manufacturers should apply the tolerance limit. Possible alternatives include the suggestions made by NAIMA and Dow. Consequently, the

<sup>76</sup> Plymouth, #01, at 1.

<sup>77</sup> 44 FR at 50219, 50227.

<sup>78</sup> Standard Practice for Selecting Temperatures for Evaluating and Reporting Thermal Properties of Thermal Insulation ("ASTM C 1058-92").

<sup>79</sup> NAIMA, #24, at 1.

<sup>80</sup> Id. at 4.

<sup>81</sup> ICAA/1, #17, at 8. See also Rock Wool Mfg./1, #06 (fully supports ICAA's submittal).

<sup>82</sup> Dow, #37, at 1.

Commission solicits comments on whether and how it should propose amending the tolerance provision, and the benefits and burdens such an amendment would confer on consumers and insulation sellers.

*Comments Regarding Sampling Procedures for the Tolerance Limit*

NAIMA recommended amending § 460.8 to require manufacturers to select test specimens in accordance with ASTM C 390-79<sup>83</sup> which is the sampling procedure required by all ASTM thermal insulation standards.<sup>84</sup>

*Discussion Regarding Sampling Procedures for the Tolerance Limit*

In the original rulemaking proceeding, the Commission concluded that the available sampling standards—specifically ASTM C 390 and Military Standard 105<sup>85</sup>—were not suitable for inclusion as requirements of the Rule because they were extremely complex and were not designed for sampling from a continual production process but, instead, were “lot” sampling procedures designed for use in individual transactions. Accordingly, the Commission left the choice of specific sampling methods to the manufacturer’s discretion. Likewise, paragraph 3.1.6 of the current ASTM sampling specification, ASTM C 390-79 (1995), establishes sampling standards applicable to a specific “lot” or “batch” (which is defined as “a definite quantity of some product manufactured under conditions of production that are considered uniform”). Although the Rule does not require specific sampling procedures, it requires that manufacturers be able to prove that test samples they select are representative of ongoing production.

To address this issue, the Commission solicits comments on whether manufacturers currently use sampling procedures that do not result in the selection of test specimens that are representative of ongoing production; which specific procedures currently are available for use in sampling from continuing production (or how sampling procedures designed for specific lots could be used to select samples from continuing production); and whether the Commission should

require the use of specific sampling procedures.

4. Use of Current Test Data

*Comments*

Dr. Yarbrough, for TN Tech, asserted that required R-Value disclosures should be based on test data no more than two years old. He contended that normal quality control activities should require more frequent thermal tests than are currently performed, and that this would not unduly burden the industry. He also recommended that, because the properties of thermal insulation can change when the manufacturing process changes, thermal test data should be based on the current manufacturing process and equipment being used.<sup>86</sup> Dr. Yarbrough would exclude reflective insulations from this requirement because the thermal measurements for these products are much more expensive than tests for mass insulations. He recommended that a test on a reflective insulation be considered current if it conforms to ASTM C 1224 and the measurements were made on the product being marketed.<sup>87</sup>

*Discussion*

When the Commission promulgated the Rule, it considered, but rejected, a recommendation in the Staff Report that the Commission require manufacturers to repeat their R-value substantiation tests every 60 days, coupled with a 5% tolerance limit. The Commission explained that the rulemaking record pointed no single retesting frequency that would be superior for all manufacturers, regardless of the type and amount of insulation they produce and sell and regardless of the variables that might affect the production of each type of insulation product. In addition, the record indicated that there was a limited availability of testing laboratories and testing equipment at that time to conduct the required testing for all manufacturers on a frequent basis.

Instead, the Commission determined to rely on a tolerance limit provision as the governing quality control mechanism.<sup>88</sup> It specified 10% as the acceptable tolerance limit, and required manufacturers to institute in-plant quality control procedures necessary to stay within that tolerance limit. This mechanism was designed to give manufacturers the flexibility to use whatever quality control procedures are necessary to ensure the accuracy of their R-value claims, using the most effective

and efficient, but the least burdensome or costly, means possible within their technical expertise. If the manufacturer changed the raw materials used or the manufacturing process, however, the resulting insulation product would be a new home insulation product. The Rule requires manufacturers to conduct a new R-value test on each new home insulation product, and to disclose the R-value (and related information) of each new product based on the new test.

The Commission agrees that it is appropriate to consider whether current conditions would justify the Commission’s requiring a more specific retesting quality control mechanism. In this regard, the Commission is interested in comments regarding how frequently manufacturers currently test their insulation products, how much the R-value of current production varies,<sup>89</sup> how frequently manufacturers change their products, whether they retest products that have changed, and what retesting schedule would be most appropriate to ensure the accuracy of R-value claims made to consumers. After considering the comments, the Commission will determine whether it should propose requiring a specific retesting schedule.

5. Determining the Thermal Performance of Reflective Insulations

Two basic forms of reflective insulation products are marketed for use in the residential market: (1) Traditional single-sheet and multi-sheet reflective insulations; and (2) single-sheet radiant barrier reflective insulations. Traditional reflective insulation products normally are installed in closed cavities, such as walls. As explained in Part IV.D.2, above, the Rule requires that manufacturers of traditional reflective insulation products use specific test procedures to determine the R-values of their products, and that manufacturers and other sellers disclose R-values to consumers for specific applications.

Radiant barrier reflective insulations, on the other hand, are installed in attics facing the attic’s open airspace. Although radiant barrier reflective insulations are covered by the R-value Rule, R-value claims are not appropriate for them because no generally accepted test procedure exists to determine the R-value of a radiant barrier reflective insulation in an open attic. Sellers who make energy savings claims for radiant barrier insulations, however, must have

<sup>83</sup> The current version of this specification is ASTM C 390-79 (Reapproved 1995): Standard Criteria for Sampling and Acceptance of Preformed Thermal Insulation Lots (“ASTM C 390-79 (1995)”).

<sup>84</sup> NAIMA, #24, at 4.

<sup>85</sup> The version of the military standard in effect at that time was: Sampling Procedures and Tables for Inspection by Attributes, MIL-STD-105D (“Military Standard 105”).

<sup>86</sup> TN Tech/Yarbrough, #26, at 2.

<sup>87</sup> *Id.* at 3.

<sup>88</sup> 44 FR at 50229.

<sup>89</sup> For example, is the R-value of the insulation being produced consistently below the R-value claimed and previously determined, even if it is within the Rule’s 10% tolerance?

a reasonable basis for the claims under Section 460.19(a) of the Rule.

### a. Traditional Reflective Insulations

#### i. Single-sheet Products

##### Comments

Three comments recommended allowing the use of updated or alternative test procedures to measure the emissivity of traditional single-sheet reflective insulations.<sup>90</sup> Celotex and PIMA<sup>91</sup> recommended requiring that emissivity be determined under ASTM E 408-71 (1990),<sup>92</sup> ASTM C 835-82 (1988),<sup>93</sup> or another method that provides comparable results. Dr. Wilkes, for ORNL, reported that ASTM is in the final stages of developing a procedure to measure the emittance of foil sheets with a portable Emissometer, and recommended that the Commission include this procedure in section 460.5(c) when ASTM adopts it.<sup>94</sup>

##### Discussion

ASTM now has adopted the procedure (ASTM 1371-97)<sup>95</sup> that Dr. Wilkes recommended. Dr. Wilkes informed the Commission's staff that the procedure is a very simple, quick measurement, using an instrument that costs about \$1,000. He also informed the staff that, while there is no meaningful statistical difference between the results of measurements under ASTM C 1371-97 and ASTM C 835-95, the ASTM C 835-95 procedure is considerably more complicated.

The Commission solicits comments on the accuracy, reliability, and consistency of each of these procedures in measuring emissivity; the costs of conducting the procedures; and whether the Commission should require the emissivity be measured by only one procedure to ensure that measurements of emissivity are accurate and reliable.

<sup>90</sup> NAIMA, #24, at 3; Celotex, #25, at 4; PIMA, #30, at 6-7. See Part IV.D.2, supra, for a discussion regarding the use of emissivity in determining the R-value of a single-sheet reflective insulation product.

<sup>91</sup> Celotex, #25, at 4; PIMA, #30, at 6-7.

<sup>92</sup> The current version of this specification is ASTM E 408-71 (Reapproved 1996): Standard Test Methods for Total Normal Emittance of Surfaces Using Inspection Meter Techniques ("ASTM E 408-71 (1996)").

<sup>93</sup> The current version of this specification is ASTM C 835-95: Standard Test Method for Total Hemispherical Emittance of Surfaces from 20 to 1400° C ("ASTM C 835-95").

<sup>94</sup> ORNL/Wilkes, #29, at 5.

<sup>95</sup> Standard Test Method for Determination of Emittance of Materials Near Room Temperature Using Portable Emissometers ("ASTM C 1371-97").

#### ii. Multi-sheet Products

##### Comments

The five comments that addressed the Rule's R-value testing requirements for traditional multi-sheet reflective foil insulations recommended requiring that R-values be determined according to the procedures specified in ASTM C 1224-93, either in addition to or instead of the two ASTM R-value test procedures specified in the Rule.<sup>96</sup> Dr. Wilkes, for ORNL, explained that ASTM C 1224-93 requires R-value testing according to ASTM C 236 or ASTM C 976, but specifies additional instrumentation for the tests and a method of calculating R-values based on the R-value test procedure measurements. He further recommended requiring that the tests be conducted at the mean test temperature and temperature differential specified in ASTM C 1224-93.<sup>97</sup>

##### Discussion

Traditional multi-sheet reflective insulations must be tested in an enclosed cavity system that includes air spaces. Testing such a system requires the construction of a test panel to contain the reflective insulation. R-values determined in these systems tests may vary depending on the size and configuration of the test panel, the materials used to construct the test panel, how mean temperature and temperature differential are measured, and the corrections for components such as framing members used in the test panel that are made in the calculation of R-values based on the test results. ASTM C 1224-93 includes requirements concerning the construction of the test panel, verification of the R-value measurement, and calculation of the R-value of the reflective insulation from the R-value measurement of the entire system. The Commission concludes that requiring standardization of these variables would be comparable to the Rule's requirements that test specimens of certain mass insulation products be prepared according to specified

<sup>96</sup> NAIMA, #24, at 3 (ASTM C 1224-93 was not developed when the Rule was issued; reference in the Rule to C 236 and C 976 is unnecessary because those standards are incorporated into C 1224); Celotex, #25, at 4; TN Tech, #26, at 3; ORNL/Wilkes, #29, at 6; PIMA, #30, at 6.

<sup>97</sup> ORNL/Wilkes, #29, at 6. ASTM C 1224-93 requires testing at a cavity mean test temperature of 75±4 °F (24±2 °C) with a temperature difference across the insulated cavity of 30±2 °F (16.5±1 °C). These temperature requirements are similar to those currently required by the Rule, but ASTM C 1224-93 specifies that the temperatures are those within the cavity (not including the cavity walls, or the air temperatures inside or outside the house) and incorporates tolerances to allow minor temperature variations.

procedures and that R-values determined under ASTM C 177-85 (1993) or ASTM C 518-91 be reported in accordance with the requirements of ASTM C 1045-90, and would benefit consumers by making R-value claims for these products more accurate and reliable.

For these reasons, the Commission proposes requiring that R-values for reflective insulations be tested according to ASTM C 236-89 (1993) or ASTM C 976-90 in a test panel constructed according to ASTM C 1224-93, and under the test conditions specified in ASTM C 1224-93, and that the R-values be calculated according to the formula specified in ASTM C 1224-93, from the results of those R-value tests. The Commission solicits comments on this proposal.

### b. Radiant Barrier Products

##### Comments

Dr. Wilkes, for ORNL, states that ASTM is developing a method for evaluating the thermal performance of low-emittance foils used in residential attics to reduce radiative transport across the attic air space. He recommended that the Commission incorporate this method into the Rule once ASTM adopts it.<sup>98</sup>

##### Discussion

ASTM has now adopted the standard referred to by Dr. Wilkes. The standard, ASTM C 1340-96,<sup>99</sup> incorporates a complicated calculation (and computer program) to determine the heat flux through an attic containing a radiant barrier. The results do not determine an R-value rating, but instead a performance value that might serve as a reasonable basis for energy savings claims (and related performance claims) made about radiant barrier insulations. The Commission solicits comments concerning the specific type of performance the standard measures, how the standard may be used to substantiate energy savings claims or other performance claims for radiant barrier insulations, the types of installations of radiant barrier insulations for which the standard may be used, the accuracy of the determinations made under the standard, and whether the Commission should require that energy savings or other performance claims for radiant

<sup>98</sup> Id. at 5.

<sup>99</sup> Standard Practice for Estimation of Heat Gain or Loss through Ceilings Under Attics Containing Radiant Barriers by Use of Computer Program (ASTM C 1340-96").

barrier insulations be based on the standard.

#### 6. Additional Laboratory Procedures for Testing Loose-fill Insulations

##### Comments

NAIMA recommended that the Commission require testing of loose-fill insulations "in full conformance with ASTM C 687-93."<sup>100</sup> NAIMA explained that C 687 has been significantly improved since the Rule became effective and that it now deals more specifically with test specimen preparation techniques, stabilization times, and measurement of the specimen density in the test area, resulting in a significant improvement in test precision.<sup>101</sup>

##### Discussion

ASTM C 687-95 (the current ASTM specification) is a standard practice, rather than a test procedure. It specifies procedures to be followed in testing a variety of loose-fill insulations to be used in other than enclosed applications. It is a detailed laboratory procedures guide that appears to be both comprehensive and complicated. In an attempt to minimize burdens imposed by the rule, the Commission limited its testing requirements to the minimums necessary to ensure the accuracy and reliability of test results. The Rule, therefore, specifies only the basic R-value test procedures and test specimen preparation procedures for certain products that are necessary to account for factors that can significantly affect R-value results (e.g., aging, settling). In the original rulemaking proceeding, the Commission considered, but rejected as unnecessary, requiring adherence to more detailed standard practice or standard guide specifications, such as ASTM C 687. Without data substantiating the need to specify detailed laboratory operating procedures, for these insulations or others, the Commission is reluctant to consider imposing additional requirements. The Commission invites public comments, however, on whether and why there is a need to specify in more detail the laboratory procedures that should be followed in preparing test specimens and conducting R-value test procedures, for loose-fill insulations as well as other forms of insulations, and the benefits and burdens from such additional requirements.

<sup>100</sup> The current specification is: Standard Practice for Determination of Thermal Resistance of Loose-fill Building Insulation ("ASTM C 687-95").

<sup>101</sup> NAIMA, #24, at 2.

#### E. Other Disclosure Issues

##### 1. Disclosures on Labels and Fact Sheets

###### a. "What You Should Know About R-values"

##### Comments

The Rule requires the manufacturer's fact sheet to include a specific statement entitled "What You Should Know About R-values" that explains the meaning of R-value and lists factors consumers should consider when purchasing insulation.<sup>102</sup> Regal suggested that this statement should be more specific in explaining how consumers can determine the amount of insulation they need. Regal commended the Insulation Fact Sheet published by the DOE for providing the best such information for consumers, but contended that it is not readily available in the marketplace. Regal also explained that the DOE ZIP Computer Program can be used to make a cost-benefit analysis for specific insulation products based on their cost per R-value and expected benefits.<sup>103</sup>

Corbond suggested that the current Rule has four negative effects that the Commission should address: (1) The Rule codifies the least effective measure of insulation performance, conductivity, as the sole measure widely used for comparing insulation value; (2) the Rule's emphasis on a product's R-value, as opposed to factors that affect installed performance, retards the development and acceptance of new products that perform better than fiberglass insulations because their performance appears the same when measured by R-value alone; (3) energy codes that require the installation of specific R-values favor products such as fiberglass insulations because the code requirements do not recognize the superior performance of insulations that are not subject to degradation of R-value in actual use due to factors such as venting, wind, convection, and moisture accumulation; and (4) the Rule perpetuates the use of an obsolete

<sup>102</sup> The required statement is:

READ THIS BEFORE YOU BUY

What You Should Know About R-values.

The chart shows the R-value of this insulation. R means resistance to heat flow. The higher the R-value, the greater the insulating power. Compare insulation R-values before you buy.

There are other factors to consider. The amount of insulation you need depends mainly on the climate you live in. Also, your fuel savings from insulation will depend upon the climate, the type and size of your house, the amount of insulation already in your house, and your fuel use patterns and family size. If you buy too much insulation, it will cost you more than what you'll save on fuel.

To get the marked R-value, it is essential that this insulation be installed properly.

<sup>103</sup> Regal, #16, at 2-3.

product, fiberglass insulation, which requires supplementation by other products and techniques (e.g., foam caulk, house-wrap, sheet vapor barriers, foam insulation sheathing, and venting) to help it do the job it should be able to do on its own.<sup>104</sup>

CIMA and Corbond recommended that the Commission add language to the required statement to address these concerns. CIMA recommended the following statement:<sup>105</sup>

R-value is important, but it is only one of many factors that affect the actual performance of insulation as installed. Other important factors to consider include air permeability, ability of the insulation to "tighten" the building against air infiltration, susceptibility to convective heat loss under cold conditions, and proper installation.

Corbond supported CIMA's suggestion, but recommended the use of an expanded version of the statement:

R-value is important, but it is only one of the many factors that affect the actual performance of insulation as installed. Other important factors to consider include air permeability, ability of the insulation to "tighten" the building against air infiltration, susceptibility to convective heat loss under cold conditions, the potential for moisture permeation and accumulation and its deteriorating effects, and proper installation. Consult your insulation manufacturer for information regarding the true performance efficiency of the insulation under conditions appropriate to your climate.

##### Discussion

The original purpose of the required explanation in fact sheets was to minimize disclosure burdens on industry members who advertise energy or fuel savings. Instead of requiring them to provide lengthy disclosures in ads that claim energy savings, the ad simply could refer consumers to information in the manufacturer's fact sheet.<sup>106</sup> This approach would ensure that the explanatory information would be made available to consumers, while keeping advertisements less cluttered.

The Commission recognizes that, as the comments have indicated, more information could be provided in the explanation about how consumers can purchase the most cost-effective amount of insulation, and that there are additional factors that can affect R-value and performance in actual use. The Commission drafted the statement to balance consumers' need for information against keeping the statement simple enough to be useful and not detract from its basic purpose—making consumers aware that there are

<sup>104</sup> Corbond, #41, at 1-2.

<sup>105</sup> CIMA, #19, 4-5.

<sup>106</sup> 44 FR at 50233-34.

various factors they should consider when purchasing products to make their homes more energy efficient.

Because new information may be available about the factors that affect insulation performance, the Commission is willing to consider revising the explanation. The Commission is concerned, however, that many consumers would not understand the meaning or impact of a general cautionary statement that contains terms such as "air permeability," "susceptibility to convective heat loss under cold conditions," "the potential for moisture permeation and accumulation and its deteriorating effects." The Commission, therefore, solicits comments regarding how the explanation could be revised to provide the most useful information to assist consumers in making purchasing decisions. In particular, the Commission is interested in receiving information about the factors that should be included, why those factors are important, how the information could be explained in a meaningful and helpful manner, and how the information would assist consumers in making purchasing decisions. Among other things, commenters are requested to include data such as consumer perception studies that demonstrate whether suggested alternative disclosures would be meaningful to consumers.

#### **b. Disclosures for Batt, Blanket, and Boardstock Insulations**

Subsections 460.12(b)(1) and 460.12(B)(4) of the Rule require that manufacturers label all packages of batt/blanket insulations and boardstock insulations, respectively, with a chart showing the R-value, length, width, thickness, and square feet of insulation in the package, and 460.13(c)(1) requires that they include the chart on the manufacturer's fact sheets.

#### *Comments Regarding Batt and Blanket Insulations*

NAIMA recommended amending 460.12(b)(1) to apply to all batt and blanket insulation products by deleting the reference to "mineral fiber." NAIMA asserted that batts and blankets made of other materials, such as cotton, other cellulosic materials, and plastic fiber, have been introduced into the marketplace and that the Rule should specify labeling requirements for these new batt and blanket products.<sup>107</sup>

#### *Discussion Regarding Batt and Blanket Insulations*

The Commission agrees that all types of batt and blanket insulations should be labeled with the same basic R-value and coverage area information, and that manufacturers' fact sheets for these insulation products should include these disclosures. Like other basic coverage chart disclosure requirements in section 460.12(b), the Commission designed this coverage chart disclosure requirement to apply to the form of the product (batt or blanket), not the type (e.g., mineral fiber). The Rule refers to "mineral fiber" batts and blankets because when the Rule was promulgated the batt and blanket insulation products being sold in the residential market were mineral fiber fiberglass. The Commission, therefore, proposes amending the Rule to clarify the requirement by deleting the phrase "mineral fiber" from section 460.12(b)(1), and solicits comments on this proposal.

#### *Comments Regarding Disclosures to Assist Installers and Post-Installation Inspectors*

ICAA recommended that the Commission require manufacturers of batt and blanket insulations to mark their products with the R-value in numerical terms only. ICAA contended that the method some manufacturers use of applying stripes on unfaced batt and blanket products to indicate the product's R-value is not understood by installers, code compliance officials, and others in the building inspection community.<sup>108</sup>

To assist building code officials and others who perform post-installation inspections in determining whether the correct R-value has been installed, ICAA also recommended that the Commission require manufacturers of unfaced batt and blanket insulation products to include the following statement on their product packages:

The unfaced batt should be installed so that the R-value identification is visible for inspection. ICAA reported that the 1955 version of the Model Energy Code ("CABO/MEC"), issued by the Council of American Building Officials ("CABO"), recommends that insulation be installed in a manner that will permit inspection of the manufacturer's R-value identification

<sup>108</sup> ICAA/1, #17, at 3. ICAA provided an article from *Insulation Contractors Monthly* (Appendix A to the comment) describing guidelines, issued by NAIMA, for identifying, by means of stripes, the R-values of unfaced fiberglass insulation. See also NAIMA, #24m at 6-7.

mark. ICAA asserted that that is important that contractors who install unfaced batts and blanket do so in a way that will make it possible to verify R-value quickly and easily.<sup>109</sup>

#### *Discussion Regarding Disclosures To Assist Installers and Post-Installation Inspectors*

The R-value Rule does not require that individual pieces of insulation be marked, but instead requires point-of-sale disclosures to consumers prior to purchase on manufacturers' package labels and fact sheets, and on receipts or contracts professional installers and new home sellers must give to consumers. These prepurchase disclosures enable consumers to compare competing insulation products and make purchasing decisions. As ICAA's comment suggests, however, many manufacturers also mark individual insulation products such as faced or unfaced batts and blankets and boardstock products in some way to identify their R-value.

Under provisions of the Energy Policy and Conservation Act of 1992, DOE, the U.S. Department of Housing and Urban Development ("HUD"), and the U.S. Department of Agriculture ("USDA") have adopted the CABO/MEC for federal residential buildings or federally insured residential housing, and 33 states have adopted, at some level, some version of the CABO/MEC, or its equivalent. The CABO/MEC (including the 1995 version) requires for new residential construction (including new additions to existing residential buildings), that, among other things: (1) An R-value identification mark appear on each piece of insulation that is 12 inches wide or greater; and (2) individual pieces of insulation be installed in attics, floors, and wall cavities in a manner that permits post-installation inspection of the manufacturer's R-value identification mark. These requirements assist building inspectors in determining, after installation, whether the proper amount of insulation has been installed to meet the minimum thermal performance requirements of the CABO/MEC.

Marking individual batt, blanket, and boardstock insulation products with R-values would not provide additional prepurchase information to consumers (beyond the required disclosures on product packages, manufacturers' fact sheets, and in contracts or receipts). It would, however, facilitate R-value verification. But, the CABO/MEC already requires such marking and it has

<sup>109</sup> ICAA/1, #17, at 2. See also Rock Wool Mfg./1, #06, at 1 (fully supportin ICAA's submittal).

<sup>107</sup> NAIMA, #24, at 4.

been adopted for new residential construction by other agencies of the federal government and the majority of states. Thus, it does not appear necessary for the Commission to amend the Rule to require that individual batts, blankets, or other insulation products be marked. The Commission solicits comments, however, regarding whether this additional disclosure requirement in the Rule would assist consumers in making purchasing decisions, whether (and why) CABO/MEC requirements are insufficient to provide this information to building inspectors, and whether (and to what extent) there currently are abuses in the sale and installation of home insulation that could be remedied by duplicating the CABO/MEC requirements in the R-value Rule, as well as the costs that such an amendment would impose on manufacturers.

#### *Comments Regarding Disclosure of Thickness*

Celotex and PIMA recommended requiring the disclosure, on the required coverage charts on manufacturer's package labels and fact sheets for boardstock insulations, of the "nominal thickness" of the boards in the package. The comments asserted that boardstock insulations are produced in nominal (or average) thicknesses and expressed concern that the current wording of the section implies exact thickness.<sup>110</sup>

#### *Discussion Regarding Disclosure of Thickness*

Subsections 460.12(b)(1) and 460.12(b)(4) of the Rule require the disclosure of "thickness" for batts, blankets, and boardstock products, without defining whether the thickness disclosed must be the actual, minimum, nominal, or average thickness.<sup>111</sup> Although variations in the manufacturing process may make it difficult for manufacturers to ensure that they produce products of exact thickness, it is essential that the thickness delivered to consumers be within a reasonable tolerance because the total R-value of a batt, blanket or boardstock insulation product is directly related to its thickness. In order to provide guidance to sellers, the Commission solicits comments on: (1) Whether it should propose amending

<sup>110</sup> Celotex, #25, at 5; PIMA, #30, at 7. The Commission understands that, by "nominal thickness," the comments mean the "average thickness" of each board.

<sup>111</sup> The Commission, on the other hand, required the disclosure of "minimum thickness" for loose-fill insulations in subsections 460.12(b)(2)-(3) to address the issue of settling, which is discussed *supra*.

the Rule to specify individual tolerances for the required thickness disclosure (as well as required disclosures of net weight and other dimensions of packaged insulation products) and procedures for determining whether products are within those tolerances; (2) what tolerances and procedures it should consider, for example, the procedures and tolerances adopted by the National Conference of Weights and Measures ("NCMW");<sup>112</sup> and (3) the benefits and burdens to consumers and sellers of specifying individual tolerances and procedures for these measurements.

#### **c. Disclosures for Loose-fill Insulations**

Section 460.12(b) of the rule requires that labels on loose-fill insulation packages disclose the minimum net weight of the insulation in the package and include a coverage chart disclosing minimum thickness (after settling), maximum net coverage area, minimum weight per square foot, and (for loose-fill cellulose insulation only) number of bags per 1,000 square feet for each of several specified total R-values for installation in open attics. The Rule currently specifies different total R-values for which the disclosures must be made for loose-fill cellulose insulations and other types of loose-fill insulations. The rule requires professional installers to calculate the number of square feet to be insulated and to install the number of bags indicated on the manufacturer's coverage chart that are necessary for the desired R-value (commonly referred to as "bag count").

#### *Comments Regarding Required Disclosures*

Four comments recommended that the Commission amend section 460.12(b) to require the same total R-value and other disclosures for all types of loose-fill insulations.<sup>113</sup>

<sup>112</sup> See "Checking the Net Contents of Packaged Goods," NBS/NIST Handbook 133, Third Edition (including Supplements 1, 2, and 3) (Sept. 1998), and "Checking the Net Contents of Packaged Goods," NIST Handbook 133, Third Edition, Supplement 4 (Oct. 1994). The NCMW procedures provide mean and maximum allowable variations for the net contents of packaged items, including weight, dimensions, and other measurements.

<sup>113</sup> Hamilton, #22, at 2 (recommending disclosures at R-13, R-19, R-30, R-38, and R-42, and recommending that the combined subsection require that mineral fiber loose-fill coverage charts list number of bags per 1000 square feet); ICAA/1, #17, at 9 (R-11, R-19, R-30, and R-38); NAIMA, #24, at 5 (recommending disclosures at R-13, R-19, R-30, R-38—these are the common R-values typically installed to satisfy the roof/ceiling requirements of the CABO/MEC and many state energy codes; also recommending disclosures at all other R-values listed on the chart); GreenStone/Smith, #32, at 3 (recommending disclosures at R-

#### *Discussion Regarding Required Disclosures*

The Commission agrees that it would be appropriate to require the same disclosures for all types of loose-fill insulations for application in attics or other open areas. The Commission originally prescribed separate disclosure requirements for loose-fill cellulose insulations and other types of loose-fill insulations (primarily mineral fiber loose-fill insulations) in response to requests that the Rule, where possible, apply labeling requirements consistent with GSA's purchasing specifications. 44 FR at 50230. GSA's specifications at that time required that labels for loose-fill cellulose insulation disclose the number of bags required to cover 1,000 square feet, but did not require this disclosure on labels for loose-fill mineral fiber insulation, and it required that the mandatory disclosures be made at different total R-values for the two types of loose-fill insulations.<sup>114</sup> After the Commission promulgated the Rule, GSA eliminated its own specifications and now uses ASTM material specifications for determining which insulation products may be purchased by the federal government (or in connection with programs operated by the federal government).<sup>115</sup> The Commission believes that there no longer is any justification for requiring different disclosures for different types of loose-fill insulations for application in attics or other open areas, and proposes to apply a single set of disclosures requirements for all types. The Commission solicits comments regarding this proposal, including the total R-values for which it would be most appropriate to require the disclosures, and whether the same disclosures should apply to both dry-applied loose-fill insulations and stabilized insulations.

11, R-13, R-19, R-22, R-24, R-30, R-32, R-38, and R-40). See also Rock Wool Mfg./1, #06 (fully supporting ICAA's submittal).

<sup>114</sup> Consistent with the GSA specification, subsection 460.12(b)(2) requires that the disclosures be made at R-values of 11, 19, and 22 and all loose-fill insulation except cellulose, and subsection 460.12(b)(3) requires the disclosures at R-values of 13, 19, 24, 32, and 40 for loose-fill cellulose insulation.

<sup>115</sup> In its compliance guidelines published in 1980, the Commission's staff explained that GSA had eliminated its own specifications and recommended that manufacturers of mineral fiber and other loose-fill insulations other than cellulose include a column disclosing number of bags per 1,000 square feet in their coverage charts. Staff compliance guidelines, 45 FR 68920, at 68923-24 (1980). The Commission believes that virtually all manufacturers of loose-fill insulation currently includes this information.

*Comments Regarding Disclosure of "Minimum Net Weight"*

One comment recommended requiring the disclosure of "net weight" on loose-fill insulation packages, instead of "minimum net weight."<sup>116</sup>

*Discussion Regarding Disclosure of "Minimum Net Weight"*

Subsections 460.12(b)(2) and 460.12(b)(3) require that "minimum net weight" be disclosed on package labels of all types of loose-fill insulations, but do not require all the disclosure be made in those exact words. Some state weights and measures regulations, on the other hand, require the disclosure of "net weight" or "nominal net weight," using specific words. To ensure that manufacturers and other sellers can conform to the requirements of both the Rule and the states' regulations, the Commission's staff had advised home insulation manufacturers that the Rule does not require that the word "minimum" appear in the disclosure, and that they can use the terms required by the state regulations. The Commission affirms the staff's advice.

Further, the Commission intended the term "minimum net weight" in the Rule to mean that the package contains at least the weight claimed, because the accuracy of the information in the coverage chart depends on the package containing that amount of insulation material. Terms such as "net weight" or "nominal net weight" in state weights and measures regulations, on the other hand, have been interpreted to mean average weight per package, within a specific tolerance, over a given lot of packages or production runs. As with the thickness of batt, blanket, and boardstock insulations, discussed in Part IV.E.1.b, above variations in the manufacturing process may make it difficult for manufacturers to ensure that they produce loose-fill insulation packages filled with an exact weight of material; but it is essential that sufficient loose-fill insulation material be installed for consumers to receive the total R-value they are purchasing. If an insufficient amount of material is contained in the packages used to install insulation in a particular consumer's home, even if the average weight is correct over the sampling lot considered, that consumer will receive less insulation R-value than promised.

The Commission is committed to ensuring that consumers receive what they are promised, while also minimizing unnecessary burdens and costs on sellers. The Commission,

therefore, solicits comments on: (1) Whether it should propose amending the Rule to specify individual tolerances for the required net weight disclosure for loose-fill insulation and procedures for determining whether packages are within those tolerances; (2) what tolerances and procedures it should consider, for example, the tolerances and procedures adopted by the NCWN;<sup>117</sup> and (3) the benefits and burdens to consumers and sellers of specifying individual tolerances and procedures for the measurement of net weight.

*Comments Regarding Disclosure of "Minimum Thickness"*

Seven comments discussed issues relating to the requirement in subsections 460.12(b)(2)-(3) that labels include a coverage chart disclosing, among other information, the "minimum thickness"<sup>118</sup> of loose-fill insulations for application in attics and other open areas.<sup>119</sup> ICAA proposed that the Commission amend the Rule to require that manufacturers of loose-fill cellulose insulations disclose "minimum initially installed thickness" in addition to "minimum thickness." ICAA contended that this additional information would assist installers by preventing them from mistakenly initially installing loose fill cellulose insulation only to the "minimum thickness" currently shown on the coverage chart (that is, the minimum thickness required to obtain the claimed total R-value after the product has settled). ICAA believes that is a long-standing industry practice that violates the Rule. ICAA asserted that CIMA agrees that this additional information would result in a marked improvement in consumer protection. ICAA contended that manufacturers' failure to provide this information on coverage charts effectively results in the installation of loose-fill insulation at total R-values below what is claimed.<sup>116</sup>

NAIMA supported ICAA's proposal and recommended requiring disclosures on coverage charts of the "minimum initial installed thickness," in addition

to "minimum settled thickness," for products that settle enough to reduce the total R-value by more than five percent. NAIMA reported that ICAA has requested that loose-fill cellulose insulation manufacturers include "initial installed thickness" disclosures on coverage charts, that several manufacturers currently put this information on their coverage charts, and that ASTM has developed a test method to determine initial installed thickness to support ICAA's initiative.<sup>117</sup> Mr. Smith, for GreenStone, similarly recommended requiring the disclosure of both "minimum settled thickness" and "approximate initial installed thickness" on coverage charts of loose-fill insulations.<sup>118</sup>

Two comments specifically opposed requiring the disclosure of initial installed thickness. Hamilton contended that it is very difficult to arrive at a single thickness that will apply to all installation blowing equipment and installers' application techniques, and suggested that manufacturers should place more emphasis on training and instructions for professional installers instead of emphasizing an initially installed thickness.<sup>119</sup> Clayville commented that the issue of disclosing an initial installed thickness has been raised primarily by ICAA, whose members installed predominantly mineral fiber insulation, and that the proposal appears calculated to take advantage of the lack of a recognized test procedure to determine the settlement of (dry-applied) loose-fill mineral fiber insulations after installation. Clayville contended that requiring the addition of an initial installed thickness column would create even more confusion in the industry and would not benefit consumers.<sup>120</sup>

Tascon stated that the thickness of loose-fill insulation does not accurately determine its total R-value because there are different types of installation equipment and application techniques, including some that deliberately "fluff" (dry-applied) loose-fill insulation products; that is, that increase a product's thickness (by applying it with more air at a lower density) at the expense of its density and total R-value. Tascon recommended that the Commission continue to emphasize bag

<sup>117</sup> See note 112, *supra*.

<sup>118</sup> The term "minimum thickness" in subsections 460.12(b)(2)-(3) refers to the thickness of installed loose-fill insulation after settling, not to the thickness of a packaged product. The discussion in the text of tolerances and procedures for measuring the thickness of packaged products, therefore, does not apply to the discussion of "minimum thickness" in subsections 460.12(b)(2)-(3).

<sup>119</sup> ICAA/1, #17, at 3-4; Hamilton, #22, at 2-3; NAIMA, #24, at 5; GreeneStone/Smith, #32, at 2; Clayville, #34, at 2-3; Tascon, #35, at 2; Rock Wool Mfg./2, #39, at 1-3.

<sup>116</sup> ICAA/1, #17, at 3-4. See also Rock Wool Mfg./1, #, #06 (fully supporting ICAA's submittal).

<sup>117</sup> NAIMA, #24, at 5. NAIMA stated that the ASTM C 16 committee has developed a test method to determine initial installed thickness, and that ASTM C 16.23 has developed a draft standard guide for development of coverage charts for loose-fill insulation that includes the initial installed thickness language NAIMA recommended.

<sup>118</sup> GreenStone/Smith #32, at 2-3.

<sup>119</sup> Hamilton, #22, at 2-3.

<sup>120</sup> Clayville, #34, at 2-3.

<sup>116</sup> GreenStone/Smith, #32, at 3.

account to ensure that installers apply the necessary amount of loose-fill insulation in attics to attain the desired total R-value.<sup>121</sup>

As an alternative to disclosing minimum installed thickness for their products, several manufacturers now guarantee that the installer will attain the claimed total R-value (and the weight per square foot and density necessary for that R-value) by initially applying at least a specific "guaranteed thickness." ICAA proposed requiring manufacturers who offer this guarantee to add a "Guaranteed Thickness" column to the required coverage charts.<sup>122</sup> Rock Wool Mfg. supported ICAA's proposal as one method of assuring that consumers receive the total R-value claimed for (dry-applied) loose-fill insulations in attics and other open areas.<sup>123</sup> ICAA also proposed adding the following language to section 460.8 to spell out the obligations of manufacturers and installers regarding how the Rule's tolerance provision applies where manufacturers guarantee that the claimed R-value will be obtained when the installer applies at least the "guaranteed thickness":

If you are a manufacturer of loose-fill insulation and you guarantee R-value based upon thickness, your "guaranteed thickness" must be an installed thickness that will result in at least the minimum weight per square foot indicated on your label.

If you are an installer, you must install at least the minimum thickness and the minimum weight per square foot as indicated on the manufacturer's label. If you install a "Guaranteed Inches equal R-value" loose-fill insulation product, you must install at least the minimum thickness for the corresponding R-value as indicated of the manufacturer's label.

#### *Discussion Regarding Disclosure of "Minimum Thickness"*

ICAA has long taken the position that installers have difficulty using bag count (or weight of insulation material installed) as the measure of their compliance with the Rule (and of whether they have installed the required amount of insulation material). ICAA contends that the reason for this problem is that the person applying loose-fill insulation through a blowing hose in the attic has no way of knowing at any given point how many bags have been loaded into the hopper of the blowing machine located in the truck outside. Requiring manufacturers to add a disclosure of "initial installed thickness" to coverage charts would

give installers an additional tool to help them when they are applying dry-applied loose-fill insulation products. This additional information would not, however, allow installers to comply with the Rule simply by installing the claimed initial installed thickness, without having to count the number of bags they have installed (or otherwise ensure they have applied the required amount of insulation material) that is necessary, along with thickness, to achieve the claimed total R-value.

Because dry-applied loose-fill insulation products normally settle after installation, the Rule requires: (1) That each manufacturer determine the R-value of its home insulation product at settled density and construct coverage charts showing the minimum settled thickness, minimum weight per square foot, and coverage area per bag for various total R-values; and (2) that installers measure the area to be covered and install the number of bags (and weight of insulation material) indicated on the insulation product's coverage chart for the total R-value desired. These requirements are necessary because the claimed total R-value for a specific dry-applied loose-fill insulation can be attained only when the requisite amount of insulation material in both thickness and density has been installed.

Further, it does not appear that recognized procedures are currently available that could be used to determine, on a uniform basis, a required initial thickness for all types of dry-applied loose-fill insulations. The settled density test procedure in ASTM C 739-91, which is required for determining the R-value test specimen density for dry-applied cellulose insulation, includes an initial blown step that could serve as the basis for determining an initial installed thickness for cellulose; but ASTM has not adopted a similar test procedure for dry-applied loose-fill mineral fiber insulations. Without reliable procedures to determine initial installed thickness, claims on coverage charts of competing insulations might not be consistent, and could be misleading. Further, because the initial thickness applied may vary with the blowing equipment and application technique used, even for cellulose (where a standardized test procedure is available to use in determining an initial installed thickness), an installer who applied the initial thickness determined under the required settled density test procedure would still have to ensure that he had applied the necessary amount of insulation material.

Requiring (or allowing) manufacturers who claim a "guaranteed thickness" for

their dry-applied loose-fill insulations to include a "guaranteed thickness" column in their coverage charts on labels and fact sheets required by the Rule, as suggested by ICAA and Rock Wool Mfg., raises similar, but even more complicated, issues. Adding this disclosure might provide useful information. Without a uniform, verifiable means of determining an initial thickness that will achieve the claimed total R-value in all applications,<sup>124</sup> however, the Commission does not believe it would be appropriate to require, or allow, manufacturers to add this information to the required manufacturers' coverage charts, or to allow installers to rely on the "guaranteed thickness" alone (and not also on bag count) in determining the amount of insulation to apply to achieve the claimed total R-value.

For these reasons, the Commission does not propose amending the Rule to require the disclosure of an "initial installed thickness" or of a manufacturer's voluntary "guaranteed thickness" at this time. The Commission, however, solicits comments regarding how manufacturers of all types of dry-applied loose-fill insulations and stabilized insulations could determine an initial installed thickness, or a guaranteed thickness, for each total R-value claimed, whether the Commission should require the addition of this information to the required coverage chart for either dry-applied loose-fill insulations or stabilized insulations, and under what circumstances installing the "initial installed thickness" or "guaranteed thickness" of insulation could be a sufficient basis alone for installers to ensure that they have applied the requisite amount of insulation material.

#### *Comments Regarding the Use of Tabs or Seals on Packages*

NAIMA recommended requiring manufacturers to attach to or print on each bag of loose-fill insulation a single, unique tab or seal identifying the product, and that installers clip the tabs from each bag used and attach them to the customer's receipt.<sup>125</sup> Tascon asserted that requiring installers to give the consumer the tabs or labels from

<sup>124</sup> From a practical standpoint, providing a "guaranteed thickness" may make many insulation products less competitive. Because of variabilities in blowing equipment and application techniques among installers, manufacturers making such a guarantee may have to claim on their coverage chart that a considerably greater thickness (and more insulation material) than normal is necessary to guarantee that if the installer applies the "guaranteed thickness," the claimed total R-value will be achieved under all possible circumstances.

<sup>125</sup> NAIMA, #24, at 5-7.

<sup>121</sup> Tascon, #35, at 2.

<sup>122</sup> ICAA/1, #17, at 9.

<sup>123</sup> Rock Wool Mfg./2, #39, at 1-3. See also Rock Wool Manufacturing's comments concerning bag tabs, below.

each bag installed would be an effective way to prevent cheating.<sup>126</sup> Rock Wool Mfg. and ICAA opposed requiring the use of bag tabs.<sup>127</sup>

*Discussion Regarding the Use of Tabs or Seals on Packages*

The Commission does not believe that sufficient evidence has been presented that requiring the use of bag tabs would add materially to the Rule's existing requirements that installers install the appropriate amount the insulation and disclose, in receipt to customers, the number of bags of loose-fill insulation installed. The Commission, therefore, does not propose amending the Rule to require the use of tabs.

*Comments Regarding Advising Consumers How To Verify R-value Installed*

ICAA recommended that the Commission amend the Rule to include a statement in fact sheets for loose-fill insulations advising consumers that ICAA can provide them with information about how they can verify the total R-value of loose-fill insulations installed in attics of new homes or added to existing attics.<sup>128</sup>

*Discussion Regarding Advising Consumers How To Verify R-value Installed*

To the extent that the CABO/MEC already includes requirements and procedures for building inspectors to determine whether the required amount of insulation has been installed in new construction, it may not be necessary or appropriate for the Commission to require additional disclosures in manufacturers' fact sheets or elsewhere. For this reason, the Commission does not propose amending the Rule to require this additional disclosure, although this information may be provided voluntarily in other promotional materials. The Commission solicits comments, however, regarding whether (and in what manner) the proposed disclosure would provide benefits beyond the CABO/MEC requirements and procedures relating to building inspections, and whether (and to what extent) there currently are abuses in the sale and installation of home insulation that could be remedied

by requiring this additional disclosure, and the costs of manufacturers that would be imposed by a requirement that they include this disclosure on labels or in fact sheets.

**d. Disclosures for Urea-based Foam Insulations**

*Comments*

In the original rulemaking proceeding, the Commission determined that the inherent qualities of urea-formaldehyde ("UF") foam insulations, which were being installed at that time in wall cavities only by professional installers, would cause the products to lose volume, or "shrink." This shrinkage caused the insulation to pull away from the wall cavity in all three directions after installation, leaving the wall partially uninsulated and resulting in a lower than claimed R-value. Although both the rate and extent of shrinkage depended somewhat on the quality of the chemicals and the product's on-site formulation and application, even if a UF insulation product was installed perfectly, it would shrink and its R-value would decrease. To address this problem, the Rule requires that manufacturers' disclose the product's R-value in a manner that accounts for the product's shrinkage, or include a specific disclosure about the effect of shrinkage on R-value. 44 FR at 50220, 50231.

Celotex and PIMA recommended that the Commission revise the statement to refer to "urea-based form insulation," because the reference to "foam insulation" implies that all foam-type insulation products (including other types of cellular plastics insulations) shrink after installation, resulting in lower R-values than claimed.<sup>129</sup> PIMA stated that UF insulation is no longer sold, and that this disclosure is unnecessary and may cause consumer confusion about other foam-type insulations.<sup>130</sup>

*Discussion*

The Commission intended to limit this disclosure to UF insulations. Because it appears that UF foam insulation no longer is being sold, however, instead of clarifying this reference, the Commission proposes amending the Rule to delete this obsolete requirement. The Commission solicits comments on this proposal, especially regarding whether any UF insulation products are still being sold, and whether there are other insulation products currently on the market that

may be subject to shrinkage that affects R-value.

**2. Disclosures in Advertising and Other Promotional Materials**

**1. Disclosures Required**

*Background*

Sections 460.18 and 460.19 of the Rule specify disclosure requirements for advertisements and other promotional materials (including those on the Internet) for home insulation products aimed at consumers that are distributed by manufactures, professional installers, or retailers. They require disclosures only if the advertisement or other promotional material includes certain claims about a specific insulation product. The disclosure requirements do not apply to advertisements on television. In general, any advertisement or other promotional material that includes an R-value, thickness, or price must disclose the type of insulation, the product's R-value and the thickness needed to get that R-value, and the following R-value explanatory statement: "The higher the R-value, the greater the insulating power. Ask your seller for the fact sheet on R-values."<sup>131</sup>

Advertisements and other promotional materials that state a price also must include the coverage area at the stated thickness. Those that state the price per square foot need not disclose the coverage area. If the advertisement or other promotional material compares one type of insulation to another, the comparison must be based on the same coverage area and the R-value of each at a specific thickness must be disclosed. If it includes the price of each insulation, it must include the coverage area for the price and thickness claimed. If it claims only price per square foot, it need not disclose coverage area.

Advertisements, labels, and other promotional materials that contain an energy savings claim for an insulation product (e.g., "save 25% on heating bills") must include the following energy savings explanatory statement: "Savings vary. Find out why in the seller's fact sheet on R-values. Higher R-values mean greater insulating power." When both the energy savings explanatory statement and the R-value explanatory statement are triggered by the claims, the seller need only include the energy savings explanatory statement.

Advertisements, labels and other promotional materials that contain a

<sup>131</sup> All labels and fact sheets must include a version of the R-value explanatory statement, specifically: "R means resistance to heat flow. The higher the R-value, the greater the insulating power."

<sup>126</sup> Tascon, #35, at 2.

<sup>127</sup> ICAA/2, #40, at 1; Rock Wool Mfg./2, t39, at 1-3 (any method of R-value verification dependent on an installer correctly measuring the dimensions of a house and calculating the attic's square footage to be insulated with loose-fill insulation is inherently flawed because even the best installers make errors in measuring and arithmetic, suggested alternatives it considered superior for assuring the accuracy of R-value representations).

<sup>128</sup> ICAA/1, #17, at 9.

<sup>129</sup> Celotex, #25, at 5; PIMA, t30, at 7-8.

<sup>130</sup> PIMA, #30, AT 8 n.4.

claim that a combination of products including insulation can cut fuel bills or fuel use must also list the products used and state how much of the savings comes from each product, in addition to giving the energy savings explanatory statement. If the advertiser cannot give exact or approximate figures, it must give a ranking of the products.

#### *Discussion*

No comment addressed the required disclosures for advertisements and other promotional materials or suggested amending the rule to eliminate any of them. The Commission, however, wants to ensure that the rule does not impose unnecessary burdens on advertising and other promotional materials. When the Commission promulgated the Rule, it considered but rejected a proposal that it limit the required disclosure of the R-value explanatory statement to a specific period of time following the rule's effective date. Because insulation is a very infrequently purchased commodity, the Commission was uncertain that the R-value concept would become widely and permanently understood in a short period of time. The Commission stated it would reexamine in the future the need to continue requiring the R-value explanatory statement in advertisements. 44 FR at 50233. The Commission, therefore, solicits comments on whether it should propose amending the rule to eliminate the requirement that advertisements and other promotional materials that include the triggering claims specified in the Rule include the R-value explanatory statement, or the portion of the savings explanatory statement that explains the meaning of R-value.

In raising this issue for comment, the Commission is not considering eliminating the other disclosures for advertisements and other promotional materials that include an R-value, thickness, price, comparison claim, or energy savings claim. Those required disclosures are necessary to prevent the triggering claims from being unfair or deceptive. Further, the Commission is not considering eliminating the required disclosure of the meaning of R-value from labels or manufacturers' fact sheets. The disclosure on labels and fact sheets is necessary to ensure that consumers have the information they need to understand the R-value information contained on labels, fact sheets, and in advertising and other promotional materials; but the definition on labels and fact sheets that are available to consumers at the point of purchase may make the additional

disclosure in advertisements and other promotional materials unnecessary.

Comments should address specifically the current need for the definition of R-value in advertisements and other promotional materials, the current state of consumers' understanding of the term R-value, and whether the availability of the meaning of R-value on labels and manufacturers' fact sheets is sufficient to provide this necessary information to consumers prior to purchase. Commenters are requested to include data such as consumer perception studies that are relevant to these questions.

#### **b. Advertising on Radio**

##### *Comments*

NAIMA recommended that the Commission exclude radio ads from the Rule's disclosure requirements for advertisements. NAIMA contended that radio advertisements are similar to television advertisements, which the Rule excludes from any disclosure requirements.<sup>132</sup>

##### *Discussion*

The Rule originally applied the advertising disclosure requirements, which require disclosures only in advertisements that contain specific triggering claims, to television advertisements as well as all other types of advertising and promotional materials. Unlike other types of advertising, which simply must include the required disclosures "clearly and conspicuously," the Rule as originally promulgated included very specific requirements regarding the manner in which required disclosures would have to be made in television advertising.<sup>133</sup> Four insulation manufacturers appealed the disclosure requirements for television advertising, asserting that the requirements, particularly in light of the manner in which the disclosures would have to be made, were particularly burdensome for short television ads. The Commission settled the appeal by agreeing not to impose disclosure requirements on television ads without

<sup>132</sup> NAIMA, #24, at 7.

<sup>133</sup> 44 FR at 5045 Appendix B (1979). For example, TV ads containing triggering claims would have been required to make the disclosures simultaneously in both the audio and video portions of the ad, the video portion of the disclosure would have to have appeared in letters of sufficient size to be easily seen and read on television sets of all sizes, and the disclosures would have been required each time a triggering claim was made. The Rule also would have restricted the video background and other sounds during the audio disclosures. The Rule contains no similar restrictions concerning the manner in which disclosures must be made in radio advertising, as long as they are made clearly and conspicuously.

conducting further rulemaking proceedings, and rescinded the requirements without conducting further proceedings.<sup>134</sup> No evidence was presented in the original rulemaking or in the appeal concerning any similar burdens that the disclosure requirements would impose on radio ads. Accordingly, the Commission does not propose revising the Rule to exempt radio ads from making these important disclosures, but will accept comments on how the costs of making the required disclosures in radio ads compare to the benefits the disclosures provide to consumers.

#### **3. Disclosures by Installers or New Home Sellers**

##### **a. Fact Sheets**

##### *Comments*

Celotex and PIMA recommended that the Commission require that professional installers (under section 460.15) give a copy of the manufacturer's fact sheet to consumers upon completion of the installation, and that new home sellers (under section 460.16) give a copy of the fact sheet to new home buyers.<sup>135</sup> Celotex and PIMA asserted that these requirements would ensure the dissemination of fact sheets to consumers and promote the purpose of the Rule—that consumers receive accurate and meaningful information.

##### *Discussion*

The Commission required fact sheets to provide pre-purchase information to consumers who otherwise probably would not see the information on package labels. Moreover, to minimize the burdens that the Rule imposes on industry members, the Commission required only that installers show the fact sheets to consumers prior to purchase and give them specific disclosures in contracts or receipts about the insulation installed. Similarly, it required new home sellers to disclose in the sales contract, prior to purchase, specific information about the insulation installed (or to be installed) in the new home. The Commission has received no evidence that would justify requiring that installers or new home sellers provide fact sheets, after the purchase, that disclosure R-value information other than for the insulation the consumer has purchased. Accordingly, the Commission does not propose amending the Rule to require that the additional information suggested by the comments be provided.

<sup>134</sup> Final rule, 51 FR 39650 (1986).

<sup>135</sup> Celotex, #25, at 2; PIMA, #30, at 3.

## b. Attic Cards and Certificates

### Comments

ICAA proposed that the Commission require new home sellers to make disclosures to purchasers in attic cards signed by the new home seller, builder, and/or building inspector. These attic cards would be used only to make disclosures concerning the insulation installed in the attic of the new home, would include the information required on the package label of the insulation, and would be posted adjacent to the attic access or scuttle. ICAA contended that attic cards would provide consumers with pertinent information at no significant cost to industry members, would reduce confusion for building inspectors and homeowners, and would be a constructive tool to help ensure that installers meet specifications. ICAA stated that attic cards have been required by the State of Florida since 1991, by the Bonneville Power Administration, by Georgia Power Company's energy efficiency program, and by several other jurisdictions throughout the country. ICAA also stated that the 1995 CABO/MEC recommends that the installer provide a signed, dated, and posted certification for insulation installed in each element of the building envelope, listing the type of insulation, the manufacturer, and the R-value.<sup>136</sup> NAIMA similarly recommended that the Commission amend the Rule to add language, similar to that in the 1995 CABO/MEC, to require professional installers to provide certification of the insulation installed and to post the certification in a conspicuous place on the job site.<sup>137</sup>

### Discussion

Although the Commission's staff in the original rulemaking recommended that the Commission require the use of attic cards to make disclosures to consumers,<sup>138</sup> the Commission determined that such a requirement was not necessary in light of the Rule's requirement that new home sellers and installers give consumers written disclosures in contracts or written receipts. Attic cards are usually posted in the attic near the access opening, for later reference by building code inspectors and future owners of the home (as well as the original purchaser), or by the homeowner who has insulation added to an existing home. The Rule, on the other hand, already requires installers and new home sellers

to provide consumers with the same information in contracts that would be disclosed on an attic card or in a certification. If the seller or consumer prefers, the contract or receipt can be posted in the form on an attic card after the seller has given the written disclosures to the consumer.

Further, for insulations installed in attics of new residential construction, the CABO/MEC requires that installers provide a signed and dated certification for the insulation installed in each part of the home, listing the type of insulation, the insulation manufacturer, and the total R-value, and post the certification in a conspicuous place on the job site.<sup>139</sup> These requirements have been adopted for use in federal government programs covering new residential construction and by 33 states, at some level.<sup>140</sup>

For these reasons, the Commission does not propose amending the Rule to require additional certification or the use of attic cards. The Commission solicits comments, however, regarding whether (and in what manner, and to what extent) amending the Rule to require that disclosures be made in certifications or attic cards would provide benefits beyond those currently required by the Rule or the CABO/MEC for consumers or building inspectors, and whether (and to what extent) there currently are abuses in the sale and installation of home insulation that could be remedied by including these additional disclosure requirements in the Rule, and the costs to installers and new home sellers of providing the disclosures in certifications and attic cards.

## c. Attic Rulers

### Comments

ICAA recommended that the Commission require that new home sellers and professional installers apply attic rulers (or thickness markers) for every 500 square feet of attic space, with a minimum of three rulers, when loose-fill insulation is installed in the attics of new or existing homes. ICAA asserted that, like attic cards, attic rulers have been required by the State of Florida since 1991, and are required under the Georgia Power Company's program to encourage energy efficient homes. ICAA contended that the rulers would assist inspectors and consumers in evaluating settled thickness levels and determining whether consumers received the R-value

of loose-fill insulation claimed. According to ICAA, the 1995 CABO/MEC proposes the use of attic rulers, installed at least one for every 300 square feet in the attic, and requires that they be affixed to the attic trusses or joists, be marked with minimum initial thickness and minimum settled thickness, and face the attic access.<sup>141</sup> NAIMA similarly recommended that the Commission amend the Rule to require that blown-in loose-fill and spray-applied attic insulations be installed in a manner that would permit verification that the necessary thickness of insulation was installed; specifically, by requiring that thickness markers or attic rulers labeled in inches be installed at least one for every 300 square feet. NAIMA stated that this requirement is similar to requirements in the 1995 CABO/MEC and to requirements of some states.<sup>142</sup>

### Discussion

It is essential that both the required density (and weight per square foot) and thickness of loose-fill insulations and stabilized insulations be installed to attain a specific total R-value. The use of attic rulers could help installers apply a sufficient thickness to achieve a specific total R-value, and to apply it in a level and consistent manner (although they still would have to ensure that they apply the required number of bags and weight of insulation material). The use of attic rulers could be particularly beneficial if manufacturers included a verified initial installed thickness disclosure or a guaranteed thickness disclosure on the bag label coverage chart.<sup>143</sup> Attic rulers also could give consumers a ready means of determining, both initially and over time, whether the required minimum thickness has been installed.

The CABO/MEC already requires, for new residential construction, that installers apply blown loose-fill or sprayed (e.g., stabilized) insulation in attics with the use of thickness markers labeled in inches, attached to the trusses or joists at least one for every 300 square feet (28 m<sup>2</sup>), marked with the minimum initial installed thickness and minimum settled thickness, and installed facing the attic access. Because the CABO/MEC requires the use of attic rulers in new construction, the Commission does not propose amending the Rule to require their use. The Commission solicits comments, however, regarding whether (and in what manner, and to what

<sup>136</sup> ICAA/1, #17, at 7-10. See also Rock Wool Mfg./1, #06 (fully supporting ICAA's submittal).

<sup>137</sup> NAIMA, #24, at 6-7.

<sup>138</sup> Staff Report at 237-38.

<sup>139</sup> For blown or sprayed insulation, the installer must also provide the initial installed thickness, the settled thickness, the coverage area, and the number of bags installed.

<sup>140</sup> See Part III.E.1.b, *supra*.

<sup>141</sup> ICAA/1, #17, at 4-5, 10. See also Rock Wool Mfg./1, #06 (fully supporting ICAA's submittal).

<sup>142</sup> NAIMA, #, at 6-7.

<sup>143</sup> See Part III.E.1.c, *supra*.

extent) amending the Rule to require the use of thickness markers would provide benefits beyond those currently required by the CABO/MEC for consumers or building inspectors, whether (and to what extent) there currently are abuses in the sale and installation of home insulation that could be remedied by amending the Rule to require the use of thickness markers, and the costs to installers and new home sellers of installing and using thickness markers.

#### 4. Disclosures by Retailers

##### *Background*

Section 460.14 of the Rule requires retailers who sell insulation to do-it-yourself consumers to make the manufacturers' fact sheets for the home insulation they sell available to consumers prior to purchase. The retailer can decide how to do so, as long as consumers are likely to notice the fact sheets. For example, the retailer can put them in displays and let consumers take copies, or can keep them in a binder and have a sign telling consumers where the fact sheets are. The purpose of this requirement is to ensure that consumers have the information they need about home insulation prior to purchase to enable them to make cost-based purchasing decisions. When the Commission promulgated the Rule, bulky insulation packages were not normally available on the retailer's sales floor, so the consumer would not see the disclosures on labels prior to purchase. In addition, the fact sheets contain additional information about energy savings and other factors the consumer should consider when purchasing home insulation. See Part IV.E.1.a, above.

##### *Discussion*

No comment addressed the requirement that retailers make the manufacturers' fact sheets available to consumers. In the years since the Commission promulgated the Rule, however, the nature of retail sales of home insulation to do-it-yourself consumers has changed. Today, retailers often sell home insulation directly from warehouse-type sales floors where consumers select the packages of insulation they want. Therefore, the R-value and related information on the packages is available to consumers prior to purchase. In response to questions from retailers, the Commission's staff has advised that retailers need not make separate fact sheets available at the point of purchase if all the required fact sheet disclosures are made on the insulation package and if the insulation packages are available on the sales floor for the consumer to inspect prior to

purchase. The Commission affirms the staff's advice, proposes amending the Rule to codify this option, and solicits comments on the proposal.

#### V. Questions for Comment

Members of the public are invited to comment on any issues or concerns they believe are relevant or appropriate to the Commission's consideration of the proposed amendments to the R-value Rule, or about other issues and questions the Commission raises in the discussion in Part IV, above. The Commission requests that factual data, including consumer perception or survey data, upon which the comments are based be submitted with the comments.

To assist commenters, the Commission provides the following list of proposed amendments. The proposed amendments would: (1) Clarify specific provisions of the Rule (Parts IV.D.3 and IV.E.1.b); (2) require disclosure of the same R-value information for competing types of loose-fill insulation products (Part IV.E.1.c); (3) specify the use of current ASTM or other recognized procedures for preparing R-value test specimens for spray-applied insulations (Part IV.C.2.b) and for conducting R-value tests of multi-sheet reflective insulation products (Part IV.D.5.a.ii); (4) delete specific disclosure requirements for urea formaldehyde insulation, which no longer is sold (Part IV.E.1.d); and (5) excuse retailers from making available to consumers separate manufacturers' fact sheets under certain circumstances (Part IV.E.4).

The Commission also requests comments on whether the Commission should propose amendments to: (1) Cover additional products (*i.e.*, residential pipe and duct insulations, and insulation sold for use in commercial buildings) (Part IV.A); (2) require the disclosure of in-use performance values, as opposed to laboratory tests under static, uniform conditions, or of the performance of building systems (Part IV.B); (3) adopt additional test specimen preparation requirements to account for various factors that affect R-values (Part IV.C); (4) adopt additional or updated testing requirements (Part IV.D); and (5) revise the disclosure requirements for manufacturers' labels and fact sheets, advertisements and other promotional materials, and for professional installers, new home sellers, and retailers (Part IV.E).

In addition to the specific questions regarding each of these issues raised in the cited portions of this notice, the Commission solicits comments on the questions below. The questions are

designed to assist the public and should not be construed as a limitation on the issues on which public comments may be submitted.

To maximize the benefits and minimize the costs for consumers and sellers (including specifically small businesses), for each amendment proposed by the Commission, and by comments filed in response to this notice, the Commission in general solicits views and data on the following questions:

(1) What benefits would the proposed requirements confer, and on whom?

(2) What paperwork burdens would the proposed requirements impose, and on whom?

(3) What other costs or burdens would the proposed requirements impose, and on whom?

(4) What regulatory alternatives to the proposed requirements are available that would reduce the burdens of the proposed requirements, while providing the same benefits?

(5) What impact, either positive or negative, would the proposed requirements likely have on the environment?

#### List of Subjects in 16 CFR Part 460

Advertising, Insulation, Labeling, Reporting and recordkeeping requirements, Trade practices.

**Authority:** 15 U.S.C. 41–58.

By direction of the Commission.

**Benjamin I. Berman,**

*Acting Secretary.*

#### Appendix—List of Comments

##### *Name, Symbol, and Number*

AFM Corporation (AFM)—# 38  
 Advanced Foil Systems (AFS)—# 02  
 Matt Anderson (Anderson)—# 08  
 BASF Corporation (BASF)—# 21  
 Benchmark Foam, Inc. (Benchmark)—# 04  
 Big Sky Insulations, Inc. (Big Sky)—# 05  
 The Celotex Corporation (Celotex)—# 25  
 Cellulose Insulation Manufacturers Association (CIMA)—# 19  
 Clayville Insulation (Clayville)—# 34  
 Corbond Corp (Corbond)—# 41  
 Dow Chemical Canada Inc. (Dow)—# 37  
 Energy Control, Inc. (ECI)—# 23  
 England & Associates (England)—# 18  
 EPS Molders Association (EPSMA)—# 13  
 Fi-Foil Co., Inc., by William Lippy (Fi-Foil/Lippy)—# 42  
 Fi-Foil Co., Inc., by Ed Nowman (Fi-Foil/Nowman)—# 15  
 FischerSips Inc. (FischerSips)—# 36  
 GreenStone Industries, by Ivan T. Smith (GreenStone/Smith)—# 32  
 GreenStone Industries, by Joel Tranmer (GreenStone/Tranmer)—# 20

- Hamilton Mfg., Inc. (Hamilton)—# 22  
Insulation Contractors Association of America (ICAA/1)—# 17  
Insulation Contractors Association of America (ICAA/2)—# 40  
Insulspan, Inc. (Insulspan)—# 33  
Rose E. Kettering (Kettering)—# 07  
James A. McGarry (McGarry)—# 10  
Midwest Roofing Contractors Association (MRCA)—# 31  
North American Insulation Manufacturers Association (NAIMA)—# 24  
Oak Ridge National Laboratory, by Kenneth E. Wilkes, PhD, PE (ORNL/Wilkes)—# 29  
Oak Ridge National Laboratory, by David W. Yarbrough, PhD, PE (ORNL/Yarbrough)—# 28  
Polyisocyanurate Insulation Manufacturers Association (PIMA)—# 30  
Plymouth Foam Products (Plymouth)—# 01  
W.H. Porter, Inc. (Porter)—# 03  
Marilyn Raeth (Raeth)—# 09  
Regal Industries, Inc. (Regal)—# 16  
Rock Wool Manufacturing Co. (Rock Wool Mfg./1)—# 06  
Rock Wool Manufacturing Co. (Rock Wool Mfg./2)—# 39  
Structural Insulated Panel Association (SIPA)—# 11  
Superior Aluminum Insulation Inc. (Superior)—# 27  
Tascon, Inc. (Tascon)—# 35  
Tierra Consulting Group (Tierra)—# 12  
Tennessee Technological University, by David W. Yarbrough, PhD, PE (TN Tech/Yarbrough)—# 26  
Western Insulfoam, Division of Premier Industries, Inc. (Western)—# 14  
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