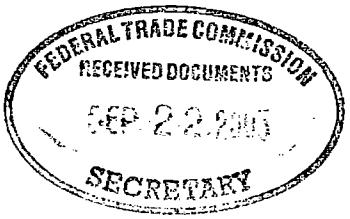
INSULATION CONTRACTORS ASSOCIATION OF AMERICA
1321 Duke Street, Suite 303
Alexandria, Virginia 22314
Tel: 703.739.0356
Fax: 703.739.0412
Web site: www.insulate.org
e-mail: icaa@insulate.org

September 22, 2003



Secretary, Federal Trade Commission
Room H-159
600 Pennsylvania Avenue, N.W.
Washington, DC 20580

RE: 16 CFR Part 460-Labeling and Advertising of Home Insulation: Trade Regulation Rule ("R-value Rule" or "Rule"); Proposed Rule Issued July 15, 2003

Dear Secretary:

By notice in the Federal Register (FR), the Federal Trade Commission ("FTC" or "Commission") has invited comments on specific questions and issues that the Commission has identified and that relate to the amendments the Commission has proposed to the R-value Rule.[1]

Following this letter, please find the comments of the Insulation Contractors Association of America (ICAA), with one attachment (See Attachment ICAA-1) intended to be included as a part of these comments, respectfully submitted to the FTC in response to the Commission's request for comments.[2]

ICAA, formed in 1977, is a member-based trade association of North American residential thermal insulation contractors and manufacturers engaged in residential new construction and retrofit markets. ICAA is the only trade association representing residential insulation contractors.

ICAA appreciates the opportunity to express its views on this matter. Please feel free to contact me directly at 703-739-0356.

Sincerely,

Michael Kwart
Executive Director

[1] 68 FR 41872 (July 15, 2003).

[2] Original delivered by hand on September 22, 2003.

Comments of the Insulation Contractors Association of America (ICAA)

RE: 16 CFR Part 460-Labeling and Advertising of Home Insulation: Trade Regulation Rule ("R-value Rule" or "Rule"); Proposed Rule Issued July 15, 2003

September 22, 2003

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b. Is ASTM C 1374 an appropriate procedure for determining the initial installed thickness for all loose-fill products?

c. Are there other test procedures that should be incorporated into the Rule in lieu of (or in addition to) ASTM C 1374?

d. Is it possible for manufacturers to provide information on labels about the appropriate blowing machine adjustments and feed rates required to achieve the initial installed thickness derived from ASTM C 1374?

e. Should the Rule specify procedures that installers must follow to measure the thickness of the installed material?

f. Is there any specific Rule language that would best achieve the proposal discussed here?

g. Will incorporation of ASTM C 1374 significantly change the costs consumers would pay for loose-fill insulation? Are any increased costs offset by benefits?

h. If installers follow initial installed coverage thickness information for installation purposes, will it be difficult to provide consumers information on coverage area as required by the Rule? Will installers continue to measure coverage area to estimate the volume and cost associated with a particular job?

2. Are there additional changes to the Rule which have not been addressed that would help to ensure that installers apply the proper amount of insulation, particularly loose-fill?

I. INTRODUCTION

The FTC has proposed to amend its Trade Regulation Rule Concerning the Labeling and Advertising of Home Insulation ("R-Value Rule" or "Rule") to: (1) streamline and increase the benefits of the Rule to consumers and sellers; (2) minimize its costs; and (3) respond to the development and utilization of new technologies to make American homes more energy efficient and less costly to heat and cool.

ICAA's commentary addresses in whole or in part the following issues and questions identified by the Commission. The Commission:

A. Invited members of the public to comment on any issues or concerns they believe are relevant or appropriate to the Commission's consideration of proposed amendments to the R-value Rule.[1]

B. Requested commentators to submit the factual data upon which their comments are based with the comments.[2]

C. Requested comments on the costs and benefits to industry members and the public of each of the proposals.[3]

D. Asked whether the Commission should amend sections 460.12(b)(2) and (3) to require the same coverage charts for all types of loose-fill insulation at R-values of 11, 13, 19, 22, 24, 32 and 40; and asked if there are any additional significant costs of compliance with the proposed change.[4]

E. Asked whether the Commission should amend the testing and labeling provisions of the Rule to require the use of ASTM C 1374 for determining the initial installed thickness of loose-fill insulation.[5]

1. Would the information derived from ASTM C 1374 allow installers to provide the appropriate amount of insulation solely through the use of the manufacturers'

[1] 68 FR 41897
[2] Ibid.
[3] Ibid, p. 41897-8.
[4] Ibid, p. 41898.
[5] Ibid.

specified blowing machine settings and the installation of the initial installed thickness specified on the bag label?

2. Is ASTM C 1374 an appropriate procedure for determining the initial installed thickness for all loose-fill products?

3. Are there other test procedures that should be incorporated into the Rule in lieu of (or in addition to) ASTM C 1374?

4. Is it possible for manufacturers to provide information on labels about the appropriate blowing machine adjustments and feed rates required to achieve the initial installed thickness derived from ASTM C 1374?

5. Should the Rule specify procedures that installers must follow to measure the thickness of the installed material? If so, what should those procedures be (e.g., one measurement for every 100 square feet)?

6. Is there any specific Rule language that would best achieve the proposal discussed here?

7. Would incorporation of ASTM C 1374 significantly change the costs consumers would pay for loose-fill insulation; and if there are any increased costs, are they offset by benefits?

8. If installers follow initial installed coverage thickness information for installation purposes, will it be difficult to provide consumers information on coverage area as required by the Rule? Will installers continue to measure coverage area to estimate the volume and cost associated with a particular job?[6]

F. Asked if there are additional changes to the Rule which have not been addressed that would help to ensure that installers apply the proper amount of insulation, particularly loose-fill;[7]

G. Posed certain general questions: To maximize the benefits and minimize the costs for consumers (including specifically small businesses), the Commission seeks views and data on the following general questions for all the proposed changes described in the Notice of Proposed Rulemaking (NOPR):

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[6] Ibid, p. 41893.
[7] Ibid, p. 41898.

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?[8]

H. Asked whether the Commission should change the term "minimum thickness" in section 460.12(b)(2) to "minimum settled thickness" to improve the clarity of language;[9]

I. Sought additional commentary on whether the Commission should amend the Rule to require the use of attic cards and attic rulers by installers;[10]

J. Requested commentary on the economic effects of the proposed amendments;[11]

K. Requested commentary on the economic impact of proposed amendments on small businesses.[12]

The substantive comments of the ICAA regarding the Commission's proposed amendments to the Rule begin in Section II.

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[8] Ibid, p. 41872–41900.
[9] Ibid, p. 41893, see footnote 97.
[10] Ibid, p. 41895.
[11] Ibid, p. 41897.
[12] Ibid.

II. DISCLOSURE REQUIREMENTS FOR LOOSE-FILL INSULATION

In section 460.12(b)(2) and 460.12(b)(3), the present Rule requires disclosures on packaging for all loose-fill insulation except cellulose at R-values of 11, 19, and 22, and for loose-fill cellulose insulation at R-values of 13, 19, 24, 32, and 40. The Commission, in its NOPR, proposes a uniform disclosure requirement on packaging applicable to all types of loose-fill insulation at R-values of 11, 13, 19, 22, 24, 32 and 40.

ICAA supports the Commission's proposal to amend section 460.12(b)(2) and 460.12(b)(3) of the Rule to result in a uniform set of disclosures applicable to all types of loose-fill insulation at R-values of 11, 13, 19, 22, 24, 32 and 40. ICAA further endorses (with ICAA's proposed minor modifications) the language of this proposed amendment of section 460.12 of the Rule as it appears in the NOPR.[13] ICAA believes that the disclosure requirement relative to loose-fill insulation should also be extended to include R-values of 30, 38, and 49 since they are the most common R-value recommendations for insulation by the U.S. Department of Energy.[14]

ICAA offers the following comments in support of its position:

(1) The R-values under which disclosure will be required under the proposed amendment represent the union of the set of required R-value disclosures for loose-fill cellulose insulation and the set of required R-value disclosures for loose-fill insulation except cellulose under the present Rule. Absent evidence to the contrary, it is reasonable to expect that these respective disclosure values were established in the past because they were and remain in common use for the respective types of loose-fill to which they apply. Therefore, ICAA concludes that for the convenience of users and in order to promote competition, the R-value disclosures required by the amended Rule should be the union of the set of required R-value disclosures for loose-fill cellulose insulation and the set of required R-value disclosures for loose-fill insulation except cellulose required in the present Rule and the R-values of 30, 38, and 49, as noted supra.

(2) The use of different respective R-value disclosure requirements for packaging of loose-fill insulations in the present Rule is anti-competitive in the sense that it represents some impediment for some insulation contractors and some members of the general public (i.e., some subset of the "do-it-yourselfers") seeking to make direct economic comparisons of

[13] Ibid, p. 41899-41900, §460.12 Labels. This amendment will result in the consolidation of what now appears in the Rule as section 460.12(b)(2) and section 460.12(b)(3) into an amended section 460.12(b)(2).
[14] Department of Energy Recommended Total R-Values for Existing Houses, Web site, www.eere.energy.gov/consumerinfo/energy_savers/r-value_map.html

products which are direct substitutes in most or all instances for one another. The use of a common set of R-value disclosures should promote greater competition and reduced prices (and cost) to the consumer.

(3) ICAA suggests that the costs that will be imposed on manufacturers by conversion to a uniform set of disclosure requirements on packaging applicable to all types of loose-fill insulation at R-values of 11, 13, 19, 22, 24, 30, 32, 38, 40, and 49 are likely to be small in both absolute and relative terms. ICAA notes that the only comment that the Commission received about the proposed amendment in its Advanced Notice of Proposed Rulemaking (ANPR) came from the North American Insulation Manufacturers Association (NAIMA).[15] The Commission noted that, "...NAIMA concurred with the Commission that there is no longer a justification for different disclosure requirements for different loose-fill insulations."[16]

The changes that manufacturers will have to make to implement the Commission's proposal to require a uniform set of disclosure requirements on packaging applicable to all types of loose-fill insulation at R-values of 11, 13, 19, 22, 24, 32, and 40 are well defined by the changes specified in the NOPR, as supplemented by ICAA's suggestion that R-values of 30, 38, and 49 be added to the requirement. Given information available to each respective loose-fill insulation manufacturer, manufacturers should be able to develop readily and without great difficulty reasonable and realistic estimates of their respective costs of implementation of this change.

Therefore, ICAA respectfully suggests that any comments that the Commission might now receive from other interested members of the public in response to the NOPR and that now assert substantial economic burdens on manufacturers resulting from implementation of this amendment should be supported by detailed and credible economic analysis.

[15] 64 FR 48024 (September 1, 1999), FTC proposal to make the set of R-values uniform for which disclosure is required on packaging for all loose-fill insulation.
[16] Ibid.

III. USE OF ASTM C 1374 FOR DETERMINATION OF INSTALLED THICKNESS OF PNEUMATICALLY APPLIED LOOSE-FILL BUILDING INSULATION

A. Introduction

Key amendments to the Rule proposed by the Commission that involve or refer to ASTM C 1374 are:

1. Amendment to section 460.5(a) to add a new subsection (5) that would require manufacturers of loose-fill insulation to determine the initial installed thickness of their product for R-values of 11, 13, 19, 24, 32, and 40 using ASTM C 1374-97 (Standard Test Method for Determination of Installed Thickness of Pneumatically Applied Loose-Fill Building Insulation).[17]

2. Amendment incorporating by reference ASTM C 1374 into section 460.5.[18]

3. Amendment to section 460.12 to require this initial installed thickness information on product bag labels.[19]

4. Amendment to section 460.12 to require manufacturers of loose-fill insulation to provide blowing machine settings necessary to achieve initial installed thickness listed on the product bag label.[20]

5. Amendment to section 460.17 to require installers to follow the manufacturer's label instructions for initial installed thickness and to use the blowing machine adjustments and feed rates specified by the manufacturer.[21]

The ICAA strongly endorses and supports these proposed amendments to the Rule and their proposed wording (with minor modifications) as they appear in the NOPR. ICAA's detailed analysis and response to issues raised by the Commission and specific questions posed by the Commission in the NOPR relative to these amendments are presented in subsequent portions of this section of ICAA's commentary. However, the primary reason that ICAA supports and endorses these proposed amendments is because they will further the principal aims

[17] 68 FR 41899, §460.5(a)(5).
[18] Ibid, §460.5(e).
[19] Ibid, p. 41900, §460.12(b)(2).
[20] Ibid.
[21] Ibid, §460.17.

of the Commission in proposing these changes, aims with which ICAA and its membership are in accord. ICAA sees these principal objectives as:

(1) Assuring that consumers receive contracted R-value,[22] [23]

(2) Facilitating the ability of consumers to verify that they have in fact received the R-value they have paid for, [24] [25] [26]

(3) Promoting fair and honest competition among substitutable insulation products (with the benefits of competition that should accrue to the consumer), and [27] [28]

(4) Accomplishing objectives (1), (2), and (3) above immediately in a way that provides the greatest net benefit to consumers without imposing unreasonable costs or other burdens on manufacturers, installers, homebuilders, retailers, or other commercial parties involved in the home insulation business.

Our substantive analysis and presentation of facts in the remainder of this section are focused on demonstrating both how and why the proposed amendments promote these principal objectives.

B. Discussion of Problems of Applying the Present Rule

ICAA believes that the proposed amendments to the Rule to require the use of ASTM C 1373 for determination of installed thickness of pneumatically applied loose-fill building insulation and to allow installers to install loose-fill insulation based upon initial thickness alone

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[22] Ibid, p. 41873, "Basis for the Rule - The Commission issued the R-value Rule to prohibit, on an industry-wide basis, specific or deceptive acts or practices...."
[23] Ibid, "specific disclosures must be made by manufacturers....."
[24] Ibid, p. 41881, "In considering amendments to the R-value Rule, the Commission, among other things, looks to ensure that consumers receive, wherever possible, the most accurate, dependable information that is reasonably available for residential insulation products."
[25] Ibid, p. 41892, "Accordingly, the Commission believes that it is desirable to consider approaches that would allow consumers to determine, for themselves, whether adequate insulation has been installed. Requiring manufacturers to add a disclosure of "initial installed thickness" to coverage charts would address many of these problems."
[26] Ibid, p. 41892-41893, "Under the Rule's current requirements, it is difficult for consumers to verify for themselves that the correct amount of insulation has been installed. In addition to considering final settled thickness, they must perform calculations regarding coverage area and bag count to determine if the proper weight per square foot has been applied. The proposed initial installed thickness information should allow consumers armed with a ruler, to determine whether the sufficient thickness of insulation has been installed."
[27] Ibid, p. 41873, See I I.C. (1), (2), and (5).
[28] Ibid, see II.D., " specific disclosures must be made..."

will provide substantial redress for all problems noted, will ultimately benefit all parties (consumers, manufacturers and installers) economically, will significantly improve the accuracy of installed R-values, and will represent the best approach to needed improvements that the ICAA is presently aware of.

Prior to addressing some of the specific questions to which the Commission has invited comment relative to these amendments, ICAA would like to provide some further commentary about widespread problems with the present disclosures and related industry practices and procedures and how these problems will be either remedied or alleviated by the proposed Rule modifications.

1. Differences Between "As Designed" and "As Built" Homes. Over one third of the nation's new housing stock is built by major national builders who regularly build large developments involving hundreds of single family homes.[29] Within eight years, this percentage is projected to increase to seventy-five percent.[30]

For a given development of a major national builder, insulation contractors employ estimators who are shown blueprints for different models. Estimators prepare bids based upon these blueprints.

Later, when the builder awards the work to the insulation contractor to insulate five model "A" and ten model "B" homes, the insulation contractor consults the bid and writes up a job ticket or work order based upon the estimates the estimator had earlier prepared.

Based upon the estimate for the "A" home and the specified R-value, the installation crew will install ten bags for the "A" home. Typically, when the crew arrives to install insulation at the first "A" home, the crew does not remeasure the specific "A" model as actually built. Actual measurement of each home by the insulation contractor might significantly increase the cost of insulation. So without actually measuring the specific home, the contractor may install "X" bags of insulation, and this may approximately produce an initial thickness that exceeds the "minimum thickness" as defined under the present Rule.

However, anecdotal information strongly suggest that many or most "as built" homes differ from their "as designed" or "as planned" drawings in ways that can substantially affect the attic space.

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[29] See, for example, DeCain, Paul F. "*The Impending Consolidation of the Homebuilding Industry*"- Published by Anderson Corporate Finance, LLC in 2002 - states that in 1997 the nation's top 100 builders built about 24% of all new homes. By the date of the report, that figure had increased to 37% of all new homes.

[30] Ibid. Decain suggests that by 2011 the top 20 U.S. builders will account for 75% or more of the new homes built.

Suppose for example that the blueprint shows an attic size of about 2000 square feet and that the "as built" attic size is 2200 square feet, representing the addition (unknown to the insulator) of another (optional) modest room or alcove. Suppose further that the specification is R-19 for the attic, and this should result in a minimum (settled) thickness of eight inches. The installation crew, which typically does not have the person who estimated the job on it, will blow the 22 bags (calculated to result in R-19 for 2000 square feet). Clearly this is likely to result in a installed R-value under R-19. However, the minimum (settled) thickness might only be .72 inches below that actually required. Depending upon the amount of settling expected from the particular insulation and the tolerances of measurement (e.g., attic cards or rulers are typically in .25 inch gradations), it would be easy for the crew to think they had installed contracted R-value, since there is no initial installed thickness specified. The insulation in the attic immediately after it had been blown might even exceed the eight inches required for the minimum (settled) thickness of the present Rule.

If, on the other hand, the Rule required the installer to install to an initial installed thickness (as the amended Rule will require), the fact that the crew does not know the "as built" differs from the "as designed" will not matter, and they will install the contracted R-value.

2. Variation in Minimum Net Bag Weight. Strong anecdotal evidence from some of ICAA's members suggests that for certain forms of loose-fill insulation there is substantial variation from the minimum net bag weight printed on loose-fill packaging. These same sources suggest that in such instances the difference between actual net bag weight and minimum net bag weight is almost invariably in the negative direction (i.e., actual net bag weight is less than the minimum net bag weight published on the bag). Our point relative to the present NOPR is that under the present Rule, insulation installers who rely in good faith on the published minimum net bag weight (in part) to deliver contracted R-value to customers may still be delivering less than contracted R-value due to variances between the published minimum net bag weight and actual net bag weight.[31] Under the proposed amendments, however, (which will require the insulator to deliver a specified R-value based on an initial installed thickness) the customer would receive contracted R-value regardless of any adverse deviation in actual bag weight from published bag weight.

3. Verification. The FTC has noted that under the present Rule verification by the consumer (or even the builder) that the installer has installed the contracted R-value is highly problematic. This is particularly true if the consumer (or an agent of the consumer) does not witness the actual installation and assures that both the bag count criterion is met (assuming that the installed bags meet minimum net weight published on the bags and that the floor space estimate accurately matched the "as built" home) and that the initial thickness is at least as great as the "minimum

[31] 64 FR 48043, See "Discussion Regarding Disclosure of Minimum Net Weight."

thickness" of the present Rule. Even then, given that there is no initial installed thickness requirement, it is at least possible that the in-situ settled thickness will be less than the "minimum thickness" of the present Rule and thus possibly fail to deliver the contracted R-value.

Given the nature of new construction and the numerous inspections that must be conducted, it is also often impractical for the consumer or representative of the builder to witness the installation of insulation for verification purposes. Such a requirement would clearly add expense and inconvenience to new construction. Even if such inspection at the time of installation became common, it would not address the problem of verification by the consumer sometime after sale to the first owner by the builder or subsequent owners.

Under the present Rule, the only sure method of after-the-fact verification that the contracted R-value has been installed is the "cookie-cutter method." While it is possible that an individual consumer could execute this method of verification on his own, it would be extremely dangerous, time consuming, and difficult for him to do so.[32]

However, under the proposed amendment to the Rule, the consumer will have both an initial installed thickness and a minimum settled thickness value upon which to rely. **Therefore, at any time subsequent to initial installation of the insulation, the consumer may, by the use of a straight edge or ruler alone, measure the thickness of the insulation.** If the thickness falls anywhere between the initial installed thickness and the minimum settled thickness, the consumer has good reason to believe that he has probably received at least contracted R-value (i.e., he does not have to sample the weight of insulation per square foot of attic space as he would have to do under the present Rule). The proposed Rule would therefore permit consumers to easily and inexpensively determine for themselves whether adequate insulation has been installed.

4. Complexity of Newer Housing Stock Makes Correct Calculation of Bag Count Required Under the Present Rule Very Difficult and (Often) Infeasible. In 1971 the typical new home followed a basic ranch-style or bi-level design and had about 1520 square feet of living space.[33] These homes also tended to be rectangular. It was then relatively simple for the insulation contractor's estimator to perform adjustments for framing members and attic structures. By 2002, the average new home had 2,320 square feet.[34] In addition to being more than one and one half times larger than homes built in 1971, homes built in 2002 are far from rectangular,

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[32] A more detailed description of the "cookie-cutter method" and the costs associated with having it professionally performed are described infra.

[33] Source for 1971 average square footage, "Characteristics of New Housing Construction Reports - C25-75-13" U.S. Department of Commerce, Bureau of the Census.

[34] National Association of Homebuilders Web site, www.nahb.org. "Characteristics of New Single Family Homes 1987-2002" utilizing U.S. Census Department data.

complicating attic square footage calculations. New standard construction techniques such as multiple-tiered, tray, cove, and coffered ceilings and girder trusses complicate the problem of estimating attic space.

Almost all standard models produced by major builders offer bumpout rooms such as libraries, sun rooms, great rooms, and nooks. Blueprints used for estimation often obscure these options. Further, and perhaps more importantly, blueprints usually do not include truss layouts, thus professional insulation contractors cannot possibly obtain all the information to ensure a reasonable outcome.

Such complications make it very difficult to accurately quantify bag count. Under the present Rule, which does not require an initial installed thickness disclosure by the loose-fill insulation manufacturer, it is very easy for the installer to believe in good faith that he has installed contracted R-value by applying bag count and a minimum thickness, when in fact less than the contracted R-value has been installed.[35] If the Rule is amended as proposed, the installer can be assured of delivering contracted R-value by installing an initial installed thickness, something he can readily control despite inaccuracies in estimation of attic floor space due to housing complexity.

5. Retrofit. If the attic has already been insulated, it is very difficult to directly measure the attic floor space for estimating without damaging the existing insulation. Further, the homeowner may not have a blueprint in order to develop an accurate bag count estimate. This becomes a greatly reduced problem if the Rule is amended (as proposed) to allow installers to rely on an initial installed thickness value to achieve contracted R-value.

6. The Leftover Bag Problem. ICAA, in this set of comments, believes that it has demonstrated good reason why the present Rule's reliance (in part) on bag count and requirement that installers perform to bag count calculations in order to deliver the contracted R-value should be changed.

There are a number of reasons why working to bag count causes difficulties in the field. To explain all of these in detail would significantly add to the length of ICAA's commentary. However, ICAA would like to cover one point related to the problems of working to bag count:

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[35] ICAA notes that this discussion is more than theoretical. In addition to anecdotal evidence from members, ICAA sponsored a contest in 1998, as reported in *Insulation Contractors Report*, November/December 1998, in which the same set of "new-in-1998" house plans was sent to insulation contractors who were ICAA members. A cash prize was offered to the contractor who achieved the most accurate estimate. R-value specifications, loose-fill insulation, and prices per square foot were specified. Therefore the only source of variation could come from the contractor (estimator). When the results were examined, low estimates were as much as 20% below the correct value and high estimates were as much as 31% above the correct value.

The "Leftover" Bag Problem - The installer in the attic, regardless of whether he or she has a running bag count available, is attempting to apply a uniform thickness over what is often a large and complex space. Suppose that in a particular instance, the installer has completed blowing 26 of the 30 bags estimated as needed and has covered all or nearly all of the attic space to a fairly uniform thickness. How then does the installer appropriately install the remaining bags? Given a large floor space, it is now going to be difficult to provide uniform or near uniform coverage, perhaps particularly at areas furthest from the attic opening without stepping or crawling on just-applied insulation. Notwithstanding any safety issues, the installer cannot walk on the previously installed insulation, since this will compress it, reducing its thickness and probably adversely affecting its R-value.

Again, this becomes either a non-problem, or a greatly reduced problem if the Rule is amended (as proposed) to allow installers to rely on an initial installed thickness value to achieve contracted R-value.

C. Comments on Specific Issues Identified by the Commission and Response to Specific Questions Asked by the Commission

1. Should the Commission amend the testing and labeling provisions of the Rule to require the use of ASTM C 1374 for determining the initial installed thickness of loose-fill insulation?

ICAA strongly supports amendment of the testing and labeling provisions of the Rule to require the use of ASTM C 1374 for determining the initial installed thickness of loose-fill insulation. ICAA believes that these amendments will benefit consumers, builders, insulation manufacturers, and installers. Some of these benefits will be available immediately or nearly immediately, and some of them will be realized in the longer term. ICAA's analysis and evidence supporting this position are presented both supra and infra.

a. Would the information derived from ASTM C 1374 allow installers to provide the appropriate amount of insulation solely through the use of the manufacturer's specified blowing machine settings and the installation of the initial installed thickness specified on the bag label?

ICAA believes that the installed thickness information alone derived from ASTM C 1374 will allow installers to provide the appropriate amount of insulation by installing the initial installed thickness as determined by ASTM C 1374 for that respective loose-fill product. It is ICAA's understanding that the proposed disclosure of blowing machine settings by the loose-fill insulation manufacturer in section 460.12(b)(2) conforms to the test procedure reporting

requirements of ASTM C 1374 section 11 (11.1.4).[36] The proposed language to section 460.17 should delete any reference to blowing machine settings since it is not in conformance with the requirements of ASTM C 1374.

ICAA suggests use of ASTM C 1374 as contemplated in the proposed amendments to the Rule will provide much greater assurance than available today that the contracted R-value is installed and represents the best means of doing so that is both practically feasible and available today.

b. Is ASTM C 1374 an appropriate procedure for determining the initial installed thickness for all loose-fill products?

It is ICAA's position that ASTM C 1374 is an appropriate uniform test procedure for determining the initial installed thickness for all loose-fill products. Please see ICAA's discussion concerning the nature of the development and maintenance of ASTM C 1374 as a "full consensus" ASTM standard in "III.C.1.c" immediately below. However, unless it is unduly burdensome for the Commission to do so, ICAA would have no objection to the addition of a procedure which allows for individual manufacturers to petition the Commission for individual exceptions for specific products provided that:

- The manufacturer be required to convincingly demonstrate why application of ASTM C 1374 to the specific loose-fill insulation product for which the exemption is sought will yield substantially false or misleading results; and

- The manufacturer proposes a substitute procedure to provide initial thickness data for the specific product substantially more accurate than would be obtained through the application of ASTM C 1374 to the product, and

- That the Commission requests and considers public comment regarding any such petition by any such manufacturer; and

- That until such time that an exception is granted by the Commission, the product should be subject to the requirements of the proposed amendments regarding the use of ASTM C 1374.

c. Are there other test procedures that should be incorporated into the Rule in lieu of (or in addition to) ASTM C 1374?

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[36] Proposed section 460.12(b)(2), NOPR.

It is ICAA's position that there are no other test procedures that should be incorporated into the Rule in lieu of (or in addition to) ASTM C 1374 at this time for the following reasons:

ASTM C 1374 is the only generally accepted standard test procedure developed for the express purpose of determining the installed thickness of pneumatically applied loose-fill building insulation. The American Society for Testing and Materials (ASTM) was organized more than one hundred (100) years ago and is one of the largest voluntary standards development organizations in the world. It is a not-for-profit organization that provides a forum for the development and publication of voluntary, consensus standards for materials, products, systems, and services. ASTM standards are widely accepted by U.S. government agencies, including the Commission, and are regularly used in U.S. government-issued rules and regulations which have the force of law.

ASTM C 1374 was developed as a full consensus standard for the express purpose of providing a uniform test method for the determination of the initial installed thickness of pneumatically applied loose-fill building insulation on coverage charts.[37] Under ASTM procedures, a "full consensus" standard is a standard developed through the cooperation of all industry parties who have an interest in participating in the development and/or use of the standard. To the best of ICAA's knowledge, there is no other widely accepted standard for determining the initial installed thickness of pneumatically applied loose-fill building insulation or that improve upon, supplement, or add to results that are obtained from proper application of ASTM C 1374.[38]

ASTM C 1374 has withstood the test of time. Initially issued in 1997, it has recently been subject to ASTM's regular periodic review process for ASTM-issued standards, and it is ICAA's understanding that an update will be issued, with only very slight, nonsubstantive modifications sometime late in 2003.

Certain specific alternatives which may be suggested are all either technically and/or administratively inappropriate and/or lack the widespread acceptance of ASTM C 1374. It is possible that certain interested parties may, in their comments to the Commission, suggest that a **Guide**, presently under development by ASTM, is an appropriate substitute for, or supplement to, ASTM C 1374.[39] ASTM rules prohibit ICAA from reproducing or quoting this document in whole or in part since it is a draft and has not yet been issued. ICAA notes that as presently

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[37] ASTM C 1374 is under the jurisdiction of ASTM Committee C-16 on Thermal Measurements (the ASTM Committee responsible for the other R-value test procedures required by the R-value Rule).
[38] Except for additional ASTM standards and/or other procedures which are referenced in ASTM C 1374 itself and that may be needed for the proper application and interpretation of ASTM C 1374.
[39] "Draft ASTM Standard Guide for Determining Blown Density of Pneumatically Applied Loose-Fill Mineral Fiber Thermal Insulation" (referred to in this discussion as "Guide").

drafted this Guide appears to be similar to a published (but confidential) procedure by the Mineral Insulation Manufacturers Association (MIMA) known as the "Bass Boat" Technique.[40] ICAA believes this Guide is not appropriate as a replacement for, or supplement to, ASTM C 1374 for the following reasons:

(1) It is not yet approved or issued by ASTM;

(2) The Guide is not being developed for the express purpose of aiding loose-fill installers in determining an appropriate initial thickness but rather for use by manufacturers for product design and possibly quality control. This is stated both explicitly in the Guide itself as it now exists in draft and in the MIMA procedure upon which it appears to be largely based. However, **the ASTM C 1374 Standard was explicitly developed as a "full consensus" uniform test procedure so that manufacturers could determine an initial installed thickness and provide loose-fill insulation installers the necessary initial thickness of insulation.**[41]

(3) The ASTM C 1374 test procedure differs substantially from the procedure described in the Guide or from the related "Bass Boat" Technique, and there is no guarantee that results are directly substitutable. Any application of the ASTM C 1374 procedure starts with a weighed specimen of loose-fill insulation that has been calculated, when pneumatically applied, to result in a specific R-value. Thus the dependent variable determined explicitly by application of ASTM C 1374 is the initial thickness. The procedure described in the draft of the Guide or "Bass Boat" Technique begins with a targeted initial thickness and then only weighs the material once that targeted thickness has been achieved. Thus the initial thickness is not the dependent variable that the test described in the Guide or Bass Boat Technique is designed to measure.

d. Is it possible for manufacturers to provide information on labels about the appropriate blowing machine adjustments and feed rates required to achieve the initial installed thickness derived from ASTM C 1374?

ICAA believes, per the discussion above (section III.C.1.a.), that it is possible for manufacturers to provide information on product bag labels about blowing machine settings required to achieve the initial installed thickness derived from ASTM C 1374. Disclosure of the settings used to achieve the initial installed thickness values would fulfill the reporting requirements of ASTM C 1374.

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[40] MIMA is the predecessor organization to the North American Insulation Manufacturers Association (NAIMA).
[41] See section 5.2 of ASTM C 1374 - 97 which states, "The initial installed thickness value by this test method is intended to provide guidance to the installer in order to achieve a minimum mass/unit area for a given R-value."

e. Should the Rule specify procedures that installers must follow to measure the thickness of the installed material?

ICAA believes that the Rule should not specify the procedures that installers must follow to measure the thickness of the installed loose-fill insulation. ICAA offers two related reasons for this position:

(1) Both the modern history of regulation and academic thinking support the position that regulators, industry, and the public are better off to the degree that regulation specifies a mandated end-result rather than very prescriptive means of achieving that end-result. In the amended Rule, the Commission has, in ICAA's opinion, correctly mandated an end-result and specified an easily understood means of determining whether that end-result has been achieved (i.e., that consumers receive the contracted R-value and that this will be accomplished by installers by blowing the initial installed thickness of loose-fill insulation into the attic). Anything more would be unnecessarily prescriptive in ICAA's view.

(2) Per the discussion supra concerning the increasingly complex three-dimensional geometric configuration of attics, any attempt at specification of how to measure the thickness of installed loose-fill insulation and incorporate such specification in the Rule may be extraneous. While possible, such a specification may require dealing with a wide range of alternatives, with many exceptions. Such specification in the Rule might also require frequent, if not constant, maintenance and modification as housing construction styles and technology continue to evolve.

f. Is there any specific Rule language that would best achieve the proposal discussed here?

Please see discussion under "Minimum Settled Thickness" below. Further, ICAA suggests that the FTC modify the language of the Rule in the proposed section 460.17 to read ".....For loose-fill, you must follow the manufacturer's label instructions for initial installed thickness."

g. Will incorporation of ASTM C 1374 significantly change the costs consumers would pay for loose-fill insulation? Are any increased costs offset by benefits?

It is ICAA's position that incorporation of ASTM C 1374 into the Rule as presently proposed **is unlikely to significantly increase costs** consumers will pay for loose-fill insulation and may not increase them at all. Further, as our "first order" economic analysis suggests, presented infra per the attached study, any such increased first cost will likely be much more than offset by the benefit that will accrue. First, any changes which manufacturers of loose-fill insulation will have to make in order to comply with those portions of the Rule that deal with

their obligations under ASTM C 1374 will be nominal when averaged over the large quantity of loose-fill insulation produced and sold in the U.S. in any one year. ICAA expects these changes to have no discernable effect upon the cost of loose-fill insulation to the installer or to the consumer.

If in the long run the amendment causes installers to use more loose-fill insulation material and/or increase the time required for installation, then it is only reasonable that in the long run installers will eventually be able to raise their prices to recover such increased costs. However, it is far from clear that the ASTM C 1374 amendment will actually cause installers to utilize more loose-fill material or cause an increase in the time it takes to install loose-fill insulation on any given job. There are several offsetting factors that suggest net effect on cost to the consumer might be indetectible or even result in net reduced cost of installation to the consumer. These factors include:

- Many, if not all, of the field studies of insulation in attics of which ICAA is aware suggest that installers both over-install and under-install loose-fill insulation to achieve contracted R-value in attics.[42] Under the proposed amendment, installers will now have an explicit thickness target for each attic, and therefore the overall variance (both overage and underage) may be reduced, leading to little or no increase in materials cost.

- There appears to be no reason to assume that the proposed amendment to the Rule will require any additional labor to complete a given loose-fill insulation attic installation. This is particularly true, given the argument presented above which suggests that little or no additional loose-fill material will be installed (on the average). In fact, a clearer target (i.e., installed thickness) for installation may in fact reduce the time the average loose-fill attic insulation job takes. Thus, increased labor costs as a result of these amendments to the Rule are unlikely to be a source of increased costs to the consumer.

h. If installers follow initial installed coverage thickness information for installation purposes, will it be difficult to provide consumers information on coverage area as required by the Rule? Will installers continue to measure coverage area to estimate the volume and cost associated with a particular job?

It is ICAA's position that the proposed amendment to the Rule with regard to the use of initial thickness data as the means by which installers deliver the contracted R-value will not make it any more difficult for installers to provide consumers information on coverage area as

[42] See for example, Penny, Robert A. and Yarbrough, David. W., "A Survey of Loose-Fill Insulations Installed in Residential Attics" Insulation and Materials: Testing and Applications, Volume 2 ASTM STP 116, R. S, Graves and D.C. Wysocki, Editors, American Society for Testing and Materials, Philadelphia, 1991.

required by the Rule than it is for them to do so today. As noted supra, increasingly complex attic geometries and oddly (non-linear) shaped structures on or protruding through attic floors can make it difficult for installers to provide completely accurate coverage area information, despite any best intentions they may have to do so, under the Rule as it exists today. **What the Rule change will do is help to assure honest installers that they are delivering contracted R-value despite any inaccuracies in the calculation of the coverage area.**

It is also ICAA's position that installers will continue to measure coverage area to estimate the volume and cost associated with a particular job. As noted supra, an installer may well be relying on dimensional (and other) data supplied by the builder rather than actually "measuring" the attic square footage in any particular instance. The installer then calculates an estimate for the job based upon the information supplied by the builder. As also noted supra, the "as built" home that the installer must actually insulate can often differ from the information the insulator's estimator was supplied to provide the estimate. ICAA does not foresee any changes as a result of the proposed amendment to the Rule that would eliminate the coverage area disclosure or result in coverage area data being supplied to consumers any less accurately than such data supplied under the present Rule.

2. Are there additional changes to the Rule which have not been addressed that would help to ensure that installers apply the proper amount of insulation, particularly loose-fill?

Other than those changes proposed in the NOPR with suggested modifications by ICAA in these comments, ICAA is aware of no additional changes to the Rule that would help to ensure that installers apply the proper amount of loose-fill insulation and that are practical, feasible, and economic.

IV. RESPONSE TO THE COMMISSION'S GENERAL QUESTIONS

ICAA wishes to note that its responses to the Commission's "General Questions" are made with reference only to the changes in the Rule which involve the use of ASTM C 1374 and related product labeling changes unless specifically noted in these discussions.[43] ICAA now enumerates and responds to these general questions:

A. What benefits would the proposed requirements confer, and on whom?

ICAA believes that the proposed amendments would confer the following benefits on the following groups:

Residential Energy Bill-Payers. To the extent that some residential homes with attics insulated by loose-fill insulation do not receive contracted R-value, energy bill-payers for those homes are almost undoubtedly paying more for heating and/or cooling of these homes than they would if their attics had been insulated to the contracted R-value.[44] [45] [46] [47] To the extent that the changes in the Rule related to the use of ASTM C 1374 and related changes in product labeling alleviate or (in individual cases) cure this problem, there will be direct energy savings to residential energy bill-payers.

ICAA has asked the question, "If these amendments to the Rule had been in effect over the past eleven years (1992 - 2002), what is the reasonable range of economic benefit that residential energy bill-payers would have realized through reduction in the heating and/or cooling component of their bill?" Because of increases in energy costs and new residential dwelling size, it is reasonable to assume that this range of estimate of aggregate economic benefit is also a reasonable range for the forthcoming eleven year period.

Based on what ICAA refers to as this "first order" or "order of magnitude" model (See Attachment ICAA-1), ICAA expects that the total economic benefit realized by residential

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[43] 68 FR 41897.

[44] NAIMA, in its June 6, 1995, comments to ANPR 60 FR 17492 (1995) submitted that several investigations in Florida and Georgia have shown that homeowners did not always receive the R-value they paid for. These occurred under the present Rule.

[45] In the mid-1980s, the Georgia Office of Consumer Affairs conducted a survey of over 500 homes and found that more than half had less insulation than claimed. In 1990, OCA tested 827 homes and approximately 25% of the houses had measured R-values at least 20% less than claimed.

[46] Estimates of 23% attic insulation deficiency in 97 new homes in 1994 by Advanced Energy of Raleigh, North Carolina as cited in Home Energy Magazine Online, September/October 1997, Web site, www.homeenergy.org/archive/hem.dis.anl.gov/eehem/97/970913.html

[47] Dateline NBC television broadcast, investigative report on loose-fill insulation deficiencies, January 2001.

energy bill-payers will range from a minimum of about $49 million to $500 million over an eleven year period.

These estimates are based upon very conservative assumptions. They assume as a grand average a target R-value of R-30 with an R-5 deficit for all new residential construction and a target value of R-40 with an R-5 deficit for retrofit. The "low" estimate assumes that the Rule change only cures 5% of the problem and the "high" estimate assumes that the Rule change cures 50% of the problem.

ICAA presents these estimates as Attachment ICAA-1. All assumptions and data sources are noted in the study. While ICAA notes that many other approaches to estimating the range of economic benefit to residential energy bill-payers are possible and even that an enormous amount of analytic effort could be expended on improving the model as presented, such "first-order" models often prove surprisingly robust.[48]

Home Owners. Home owners with attic insulation installed by insulation contractors after implementation of the proposed amendments to the Rule will now more readily and easily (with a straight edge or ruler alone) be able to verify that they have received contracted R-value. Until implementation, the only valid after-the-fact method of verification that the contracted R-value has been installed is the "cookie-cutter" or "core" sample method, discussed extensively infra. As noted in the discussion, done professionally on a "one off" basis, the cookie-cutter test can cost several hundred dollars. Thus the home owner will be able to achieve peace of mind concerning his purchase at no additional out-of-pocket cost. Under the present Rule, consumers have no easy and inexpensive way to verify. They have no learning experience since the purchase of insulation is infrequent. However, under the proposed Rule, verification and recovery would be accessible to all, thus fostering future buying decisions.

Builders. Under the law as ICAA understands it, builders are among the primary parties responsible for assuring that owners of new residential homes received the contracted R-value. Under the requirements of the present Rule, the only certainty that the builder has that the contracted R-value is installed is to either have an employee or representative of the builder witness the installation or perform "cookie-cutter" tests. The first option has obvious labor expense associated with it and will certainly raise costs for builders. As noted supra, if the "cookie-cutter test" is professionally performed on a "one-off" basis, it may cost several hundred dollars. When performed for several new homes in close proximity (e.g., as in a new section of a

[48] For example, we note that the hypothesis that a man-made increase in greenhouse gas concentration would lead to a higher global mean temperature (i.e., "global warming") was postulated and first quantified in the late 19th century by Swedish chemist and 1903 Nobel Laureate Svante August Arrhenius. Despite enormous and sophisticated efforts since then, subsequent estimates of the rate of average global temperature change developed by modern day researchers do not differ much from Arrhenius's original (first order paper and pencil) estimates.

large development prior to sale or occupancy), the costs per test may come down significantly. However, it is unlikely, in ICAA's opinion, that the cost per test, if professionally completed, could drop much below $150 per test. Again this is a clear expense for the builder.

However, given the changes in the proposed amendment, the builder will now be able to perform verification with a ruler. Thus, builders will be able to readily assure that they are delivering contracted R-value to their customers. Since builders are liable under the law for delivering contracted R-value, the amendments may also reduce the liability and exposure of builders generally, many of whom may not directly ascertain whether the contracted R-value has been installed today because of the expense associated with doing so.

Professional Installers. The proposed Rule amendments will make it much easier for professional installers of loose-fill insulation to install the contracted R-value. The effects of the current Rule, as discussed extensively infra, in many ways act inadvertently as an impediment to professional installers who are seeking to install the contracted R-value of loose-fill in attics.

Manufacturers of Loose-Fill Insulation. It appears unlikely to ICAA that on an average per-job basis, any less loose-fill insulation will be required under the amended Rule than under the Rule today. Thus, given no other substantially related incremental costs to loose-fill manufacturers, they should be no worse off under the amendments to the Rule than they are under the Rule today. It is possible, as noted, that they will sell more loose-fill insulation. ICAA does not believe these proposed amendments will unfairly advantage or unfairly disadvantage any particular type of loose-fill insulation.

U.S. Population. The production of energy for heating or cooling purposes as it is practiced today generally results in the production of undesirable pollution which is proportional to the energy utilized. To the extent that the Rule amendments result in reduced energy consumption, they will likely result in reduced pollution as well. A "first-order" or "order of magnitude" quantification of the reduction of greenhouse gases from the Rule amendments are presented infra.

Further, to the extent that such reduction in energy usage also results in a reduction in utilization of foreign oil for this purpose, it supports national goals related to increasing energy self-sufficiency.

B. What paperwork burdens would the proposed requirements impose, and on whom?

As proposed by the Commission, ICAA does not see any additional paperwork requirements from the Rule amendments other than those already identified by the Commission in the NOPR.

C. What costs or burdens would the proposed requirements impose, and on whom?

As noted in the NOPR there are some costs associated with performing tests on loose-fill insulation product under ASTM C 1374 and related recordkeeping. Under the amendments to the Rule proposed by the Commission in the NOPR, these costs are imposed initially upon manufacturers of loose-fill insulation. While it is possible that some manufacturers of loose-fill insulation will seek to recover such costs from their customers, including insulation contractors, builders, and "do-it-yourselfers," it is possible that the former two groups might seek to recover such costs through increased prices to dwelling owners.

However, it is ICAA's position that increased costs to manufacturers for product testing and recordkeeping under ASTM C 1374 are likely to be quite nominal.[49] Any reasonable reading of ASTM C 1374 shows that the test procedure itself is quite simple to apply and does not require complex or expensive apparatus. Given also a relatively rare need to repeat testing (e.g., product modification), ICAA respectfully suggests that burden of proof of any claims of significantly increased costs to manufacturers should be on any parties to this proceeding who might make such claims.

There will also be increased costs for manufacturers related to modifications of associated product labeling or informational requirements. However, when spread over the very large number of packages of product to which such changes will apply, ICAA believes that they will prove so nominal that they will provide manufacturers with no legitimate basis for a product price increase. Because manufacturers modify product bag labels periodically, ICAA believes these costs to be negligible and may well represent no incremental cost over current labeling requirements.

ICAA notes that the initial cost to manufacturers of modifications to product labeling can be further minimized by allowing a grace or phase-in period after implementation of the amendments to the Rule during which manufacturers are allowed to "use up" any existing stock of loose-fill packaging prior to reprinting additional packaging meeting the Rule's new label information requirements. ICAA has no objection to the Commission allowing such a grace period so long as it expires no longer than ninety (90) days after the amendments to the Rule go into effect.

Further, given that there are any incremental costs of the Rule change associated with the use of ASTM C 1374 that manufacturers seek to recover, it seems likely that either the consumer

[49] In fact, loose-fill manufacturers are each currently testing their products to their own non-uniform testing procedures for coverage chart development.

will see very little or no increase in the cost the consumer pays because the effects of the increase will be diluted through generally one step (in the case of retrofit - through the insulator who buys the insulation for the retrofit job and for whom the cost of the insulation is only one component of cost) or two steps (in the case of a new home - we have the step described above and then the case that overall the insulator's charge for his or her work to the builder is generally only a very small component of the builder's overall cost of construction of the dwelling). This is a special case where a rise in wholesale prices of a given commodity has a less than one-to-one effect on the retail price of that commodity. Further, it is possible that incremental profits to manufacturers from increased sale of loose-fill insulation resulting from the Rule amendments will offset any increased costs from required testing under ASTM C 1374 or associated product label informational requirements.

Other than parties noted in this discussion, ICAA is unaware of any other parties who would suffer increased cost or other definable burdens as a result of proposed Rule changes involving the use of ASTM C 1374 in the testing and labeling of loose-fill insulation.

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

One possible regulatory alternative to the Rule amendments related to the use of ASTM C 1374 is to require a "cookie-cutter" test be performed after the completion of every loose-fill insulation job in new builder-developed residential construction. ICAA's position is that this alternative is a possible remedy to only one of the problems that the Commission wants to address through the amendments to the Rule, and it is not even a very good solution to address this problem. ICAA's reason for offering this discussion is that other regulators (i.e., other than the Commission) have proposed this remedy, or something very much like it, in other venues, although ICAA is aware of no venue in which it is presently required.[50]

Under the "cookie-cutter" or "core" test, thickness measurements are made with a long metal-scaled skewer. Then, a sheet metal sleeve is placed vertically into the insulation in the attic to ensure that all the insulation is contained within the sleeve.[51] The insulation is then removed and the net weight is then determined in order to see if the "core" sample meets manufacturer specifications for both weight and thickness, thus presumably delivering contracted R-value. This coring process is repeated at least three times.

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[50] See, for example, "Remarks by Attorney General Jim Smith November 30, 1982 to the Capital Press." On which Mr. Smith, Attorney General of the State of Florida, remarks to the Tallahassee, Florida, Press Corps, "....A more effective long-range solution, in my opinion, would be to make insulation density tests a local building inspection requirement prior to the issuance of a certificate of occupancy...."

[51] Pursuant to ICAA Technical Bulletin No. 17 "Evaluation of Installed Loose-Fill Attic Insulation."

The first thing to note about this test is that it is a completely after-the-fact test. It is done sometime only after the insulation job has been completed. It is therefore of absolutely no use as a guide to the professional insulation contractor seeking to install the initial installed thickness of insulation. Clearly, the data developed by the ASTM C 1374 test procedure provides guidance to the installer about the initial installed thickness of insulation.

Second, the "cookie-cutter" test is a disruptive test. Loose-fill insulation covering from 1.5 to 2.5 square feet (recall that the procedure calls for the removal of insulation in at least three different areas in the attic) is actually removed from the attic for testing. This causes problems in two respects. First, the tester, in obtaining at least three samples from at least three different areas of the attic, is very likely in moving around the attic to obtain samples to compress insulation at every move. This alone may result in a measurable (perhaps substantial) reduction in R-value. Second, a fair amount of material is actually being removed from the attic for weighing. This material must be restored to at least its original thickness and weight in order to assure that the test itself does not result in reduction of R-value. This may also be difficult and result in further reduction in R-value unless it is done at the same time the cores are taken (i.e., the core is taken, and, immediately after removing the core for weighing but prior to leaving the attic, each area is filled with new loose-fill material of the same or equivalent type).

Finally, cookie-cutter testing is quite expensive, and at the moment this service is not generally available. ICAA obtained three estimates of the cost of performing a "cookie-cutter" test on a "one-off" basis, and these ranged from $150 to $245 per test. Of course, the price of such testing would come down substantially if the tester were able to test attics in a number of proximate homes at the same time (e.g., as in a division of a new housing development prior to sale). This would not help in retrofit insulation jobs where independent cookie-cutter testing jobs would still largely be "one-offs" with some substantial travel time between jobs. If there were a larger demand for such service (e.g., through regulatory mandate for such service), it may become widely available, and prices might also be driven down through competition. Even so, ICAA does not foresee the cost of a cookie cutter test (including the necessary restoration of the attic) dropping below about $150 per house, particularly if anything like reasonable "chain of evidence" procedures must be followed by the tester for legal purposes.

For all of these reasons, ICAA suggest that the "cookie-cutter" or "core sample" method of testing is neither a good replacement for nor supplement to the use of ASTM C 1374 as contemplated in the proposed amendments to the Rules.

E. What impact, either positive or negative, would the proposed requirements likely have on the environment?

ICAA believes that environmental effects of the Rule change will be positive relative to loose-fill insulation requirements. The "first order" model (See Attachment ICAA-1) also attempts to put broad boundaries on the greenhouse gases that would not have been produced if the amendments had been in effect during the period 1992 – 2002. ICAA has every reason to believe that reductions over a period of the same length in the future will be similar.

The model suggests a reduction in greenhouse gases of between 185 thousand metric tons to 1,850 metric tons of emissions over an eleven-year period. These estimates are based upon very conservative assumptions. The "low" estimate assumes that the Rule change only cures 5% of the problem and the "high" estimate assumes that the Rule change cures 50% of the problem.

V. SHOULD THE COMMISSION CHANGE THE TERM "MINIMUM THICKNESS" IN §460.12(b)(2) TO "MINIMUM SETTLED THICKNESS" TO IMPROVE THE CLARITY OF LANGUAGE?

ICAA endorses this proposed change. Any simple changes that improve the clarity of language on critical installation guidance on loose-fill labeling are a good idea. ICAA believes that this proposed change is such a change.

VI. SHOULD THE COMMISSION AMEND THE RULE TO REQUIRE THE USE OF ATTIC CARDS AND ATTIC RULERS BY INSTALLERS?

ICAA is in agreement with the Commission that an amendment to the Rule requiring attic cards and rulers by installers is not warranted at this time. ICAA believes that any such amendment to the Rule would not provide additional benefits beyond those currently required by the Rule or by the International Energy Conservation Code or CABO/Model Energy Code. This opposition is based on much the same reasoning offered for ICAA's opposition to any amendment to the Rule that would specify procedures that installers must follow to measure the thickness of installed material (see discussion at III.C.1.e. supra).

VII. ECONOMIC EFFECTS OF PROPOSED AMENDMENTS ON SMALL BUSINESSES

There are principally four types of commercial businesses that might be affected by the proposed amendments to the Rule that apply to loose-fill insulation:

- Manufacturers of Loose-Fill Material
- Residential Home Builders
- Insulation Contractors
- Retailers of Loose-Fill Insulation Products Direct to the Public

Manufacturers of Loose-Fill Material. Very few of these manufacturers are likely to be "small businesses" in the sense in which the U.S. Small Business Administration (SBA) defines "small businesses." Even so, ICAA's analysis above of the effects of the Rule change on loose-fill manufacturers suggests that the magnitude of any possible adverse economic effect on any manufacturer is likely to be small and does not suggest that there will be much differential effect based on the size of the manufacturer.

Residential Home Builders. Builders of residential homes come in all sizes and some certainly do meet the SBA definition of "small businesses." However, ICAA does not see any adverse effects of the Rule changes upon builders in so far as they apply to loose-fill insulation nor sees effects which would be more advantageous to large builders than to small.

Insulation Contractors. Insulation contractors come in many sizes. Certainly a large number of ICAA's membership would easily meet the SBA definition of "small businesses." Clearly ICAA could not support these Rule changes if ICAA's analysis suggested that the Rule changes would unfairly disadvantage its membership which is "small businesses." ICAA's analysis of the expected effects of these Rule changes does not reveal any effects that appear to unfairly disadvantage insulation contractors that are small businesses.

Retailers of Loose-Fill Insulation Products Direct to the Public. Obviously, such retailers can come in many sizes. Some retailers of loose-fill insulation products may be "small businesses" under the SBA definition. However, no differential effects of the proposed Rule changes insofar as they relate to loose-fill insulation on small retailers versus large retailers are revealed from the Commission's discussion in the NOPR or in ICAA's analysis.

Attachment ICAA-1

Comments of the Insulation Contractors Association of America (ICAA)

Potential Benefits Resulting From Amending 16 CFR Part 460-Labeling and Advertising of Home Insulation Trade Regulation Rule (Rule 460 or "R-value Rule")

September 22, 2003

A substantial portion of the attics of American homes are thermally protected with loose-fill insulation. For a variety of reasons, some proportion of homes with attics insulated with loose-fill have not been receiving the level (R-value) of insulation that the provider has been contractually obligated to provide. The Federal Trade Commission (FTC) has initiated a proceeding to amend its Trade Regulation Rule Concerning the Labeling and Advertising of Home Insulation ("R-value Rule") to address this issue, attempting to, among other things, reduce the amount by which America's attics are inadequately protected thermally.

The Insulation Contractors Association of America (ICAA) has developed estimates of the fuel cost savings and reduced greenhouse gas emissions that might have occurred during 1992 - 2002 if the FTC had implemented these rules effective with homes installed in 1992. These estimates are limited to the effect of changing the level of insulation blown into the attics of American homes. ICAA developed these estimates as part of its participation in the FTC proceeding to amend its R-value Rule.

Under very conservative, reasonable assumptions the savings in fuel costs for the American residential consumer could have ranged between about $49 million and $492 million over this 11-year period, with a savings of between $9 million and $86 million in 2002 alone, depending upon how much of the deficiency might have been "cured" by the changed Rule. Society would also have benefited from the reduction in greenhouse gases. Under these same assumptions the reduction in greenhouse gases would have been between about 185 and 1,851 metric tons of carbon equivalents during the 11-year period.

THE PHYSICS OF HOME INSULATION[1]

Heat flow through an attic roughly follows Formula 1.

$$Q = A \times \Delta t / R \qquad (1)$$

where

Q	=	Heat Flow in Btu/hr
A	=	Area in ft^2
Δt	=	Temperature Differential in $^\circ F$
R	=	resistance to heat in $^\circ F$- ft^2-hr/Btu

[1] For an explanation of this theory see "Conduction: 1D Theory", at http://www.efunda.com/formulae/heat_transfer/conduction/conduction_1d.cfm.

The R-value of thermal insulation products is consistent with this definition of heat resistance. Thus, an R-value of 20 means that the installed insulation will resist the flow of heat by 20°F- ft^2-hr/Btu.

The R in Formula 1 is the thermal resistance of the entire attic complex, of which a thermal insulation product is but one component. Even without the installation of thermal insulation products, an attic provides some resistance to the flow of heat. The addition of a thermal insulation product increases the thermal resistance of the attic complex.

The effect of thermal resistance is generally an additive effect. For instance, a typical attic might have a resistance of 10°F- ft^2-hr/Btu. The addition of insulation with an R-value of 20 would increase the resistance of the entire attic complex to about 30°F- ft^2-hr/Btu. Because of the reciprocal nature of resistance in Formula 1, the heat flow would decrease by a factor of 3, the ratio of the final resistance of 30°F- ft^2-hr/Btu to the initial resistance of 10°F- ft^2-hr/Btu.

UNIT EFFECT OF ATTIC INSULATION DEFICIENCY

We have used Formula 1 to develop an estimate of the Effect of Attic Insulation Deficiency on Annual Heating Requirement, which is presented in Table 1.

Effect of Attic Insulation Deficiency on Annual Heating Requirement
(MMBtus/Year/1000 Square Feet)
Uses Population Weighted National Average
4,575 Heating Degree Days

Table 1

		Desired Insulation Level				
		R20	**R25**	**R30**	**R35**	**R40**
Insulation Deficiency Level	**R1**	0.29	0.18	**0.13**	0.09	0.07
	R3	0.97	0.60	**0.41**	0.29	0.22
	R5	**1.83**	**1.10**	***0.73***	**0.52**	**0.39**
	R10	5.49	2.93	**1.83**	1.25	0.92

Table 1: The thermal effect of an insulation deficiency will vary inversely with the desired insulation level and directly with the insulation deficiency level.

Consider the case of an attic that was supposed to be insulated to achieve a total R-value of 30, that is, 30°F- ft^2-hr/Btu. Assume that the house had 1,000 square foot of attic space and

that the house experienced winter weather of 4,575 HDD. 4,575 HDD is the national average based on a population weighted average.[2]

Formula 1 for these data is evaluated in Formula 2 by substituting the appropriate values. Note that the R-value is based on hourly measurements while the weather datum is based on daily information. Because of this difference, the scaling factor of 24 hours per day must be included to coordinate the different dimensions.

$$
\begin{aligned}
Q &= A \times \Delta t / R \\
&= 1{,}000\ ft^2 \times 4{,}575^{\circ}F\text{-Days/Year} / 30^{\circ}F\text{-}\ ft^2\text{-hr/Btu} \times 24 hr/day \\
&= 1{,}000 \times 4{,}575 \times 24 / 30 \quad Btu/Year \\
&= 3{,}660{,}000\ Btu/Year \qquad (2)
\end{aligned}
$$

where

Q	=	Heat Flow
A	=	1,000 ft^2
Δt	=	4,575°F-Days/Year
R	=	30°F- ft^2-hr/Btu

The quantity 3,660,000 Btu is 3.66 MMBtu. This is the base quantity on which are based all of the numbers in the R30 column of Table 1, the column whose data are shown in bold.

The same process can be used to determine the heating usage if the R-value was defective by 5°F- ft^2-hr/Btu. The same information is used but for the R-value of 25°F- ft^2-hr/Btu, that is, 5°F- ft^2-hr/Btu less than the desired insulation level of 30°F- ft^2-hr/Btu. An R-value of 25 would produce an annual heating load for an attic of 1,000 ft^2 of 4,392,000 Btu, or 732,000 Btu more than the desired heating level. The quantity 732,000 Btu is 0.732 MMBtu, the number shown in italics in Table 1 at the intersection of the R30 column and the R5 row. The numbers in the R5 row are shown in bold.

The Economic Effect of Attic Insulation Deficiency on Annual Heating Requirement is shown in Table 2. During the last decade, the price of fuels used to heat American homes has varied tremendously. The electricity market in California and other parts of the West has exceeded $250/MWH, which is the equivalent of $73.25/MMBtu assuming a heat content of

[2] U.S. Department Of Commerce National Oceanic And Atmospheric Administration National Environmental Satellite, Data, And Information Service Historical Climatology Series 5-1 *Monthly State, Regional, And National Heating Degree Days Weighted By Population (Includes Aerially Weighted Temperature And Precipitation)* Period: July 1999 through June 2001

3,413 Btu/KWH. The price of natural gas has also been extremely variable, at times reaching $20.00/MMBtu. The data in Table 2 is based on $10.00/MMBtu and the information in Table 1. Thus, the 1.83 MMBtu identified in Table 1 at the intersection of the R20 column and the R5 row was priced at $10.00/MMBtu to determine an annual cost of $18.30.

Economic Effect of Attic Insulation Deficiency on Annual Heating Requirement
(Dollars/Year/1000 Square Feet)
Uses Population Weighted National Average
4,575 Heating Degree Days
$10.00 Delivered Cost of Heat ($/MMBtu)

Table 2

		Desired Insulation Level				
		R20	**R25**	**R30**	**R35**	**R40**
Insulation Deficiency Level	**R1**	$2.89	$1.83	**$1.26**	$0.92	$0.70
	R3	$9.69	$5.99	**$4.07**	$2.94	$2.23
	R5	**$18.30**	**$10.98**	***$7.32***	**$5.23**	**$3.92**
	R10	$54.90	$29.28	**$18.30**	$12.55	$9.15

Table 2: The heating cost associated with an insulation deficiency will depend both on the heat that is lost and the delivered cost of heat. $10.00/MMBtu is used as a representative delivered cost of heat.

Effect of Attic Insulation Deficiency on Annual Cooling Requirement
(MMBtus/Year/1000 Square Feet)
Uses Population Weighted National Average
1,193 Cooling Degree Days

Table 3

		Desired Insulation Level				
		R20	**R25**	**R30**	**R35**	**R40**
Insulation Deficiency Level	**R1**	0.08	0.05	**0.03**	0.02	0.02
	R3	0.25	0.16	**0.11**	0.08	0.06
	R5	**0.48**	**0.29**	***0.19***	**0.14**	**0.10**
	R10	1.43	0.76	**0.48**	0.33	0.24

Table 3: A deficiency of insulation will impact the amount of energy used to cool a dwelling. The impact on cooling is dependent on the cooling degree days in that area of the country.

In many parts of the U.S., the air conditioning or cooling requirement exceeds the heating requirement of many residences. The basic heat flow equation of Formula 1 is as applicable to cooling residences as it is to heating residences. The difference appears in its application in Formula 2. The temperature differential for air conditioning is called Cooling Degree Days. Table 3 presents the Effect of Attic Insulation Deficiency on Annual Cooling Requirement using 1,193 Cooling Degree Days, which is a population weighted measurement.[3]

The Economic Effect of Attic Insulation Deficiency on Annual Cooling Requirement based on the data in Table 3 is shown in Table 4. In the U.S., cooling energy is almost exclusively electricity. As discussed previously, the cost of electricity has been extremely variable. As mentioned, the electricity market in California and other parts of the West has exceeded $250/MWH, which is the equivalent of $73.25/MMBtu assuming a heat content of 3,413 Btu/KWH. The effective cost of electricity will greatly depend on the coefficient of performance of the air conditioning equipment, which would lower the price from the stated $73.25/MMBtu. For Table 4, we have used $12.00/MMBtu as a representative value.

Economic Effect of Attic Insulation Deficiency on Annual Cooling Requirement
(Dollars/Year/1000 Square Feet)
Uses Population Weighted National Average
1,193 Cooling Degree Days
$12.00 Delivered Cost of Cooling ($/MMBtu)
Table 4

		Desired Insulation Level				
		R20	**R25**	**R30**	**R35**	**R40**
Insulation Deficiency Level	**R1**	$0.90	$0.57	**$0.39**	$0.29	$0.22
	R3	$3.03	$1.87	**$1.27**	$0.92	$0.70
	R5	**$5.73**	**$3.44**	***$2.29***	**$1.64**	**$1.23**
	R10	$17.18	$9.16	**$5.73**	$3.93	$2.86

Table 4: The unit energy cost of cooling a building will often be greater than the unit cost of heating the building because of the availability of natural gas as a direct energy source for the heating process.

The Economic Effect of Attic Insulation Deficiency on Annual Heating Requirement shown in Table 2 can be combined with Economic Effect of Attic Insulation Deficiency on Annual Cooling Requirement shown in Table 4 to develop the Economic Effect of Attic

[3] U.S. Department Of Commerce National Oceanic And Atmospheric Administration National Environmental Satellite, Data, And Information Service, Historical Climatology Series 5- 2,
Monthly State, Regional, And National Cooling Degree Days Weighted By Population (Includes Aerially Weighted Temperature And Precipitation), Period: January 2001 through December 2002

Insulation Deficiency on Annual Heating and Cooling Requirement shown in Table 5. The two tables are combined through a simple addition of the common cells.

Economic Effect of Attic Insulation Deficiency
on Annual Heating and Cooling Requirement
(Dollars/Year/1000 Square Feet)
Uses Population Weighted National Average
4,575 Heating Degree Days
1,193 Cooling Degree Days
$10.00 Delivered Cost of Heat ($/MMBtu)
$12.00 Delivered Cost of Cooling ($/MMBtu)
Table 5

		Desired Insulation Level				
		R20	**R25**	**R30**	**R35**	**R40**
Insulation Deficiency Level	**R1**	$3.79	$2.40	**$1.66**	$1.21	$0.92
	R3	$12.72	$7.86	**$5.34**	$3.86	$2.92
	R5	**$24.03**	**$14.42**	***$9.61***	**$6.86**	**$5.15**
	R10	$72.08	$38.44	**$24.03**	$16.48	$12.01

Table 5: The thermal energy cost of deficient insulation in a home is the sum of the cooling cost and the heating cost.

NATIONAL EFFECT OF ATTIC INSULATION DEFICIENCY

The US Census Bureau collects information on housing completions each year, including the average size of such houses. This information is shown in Table 6 for 1992 to 2002 for single family homes.[4] Over this time frame, the fraction of the completed single family homes that have blown insulation in their attics has varied. The data in Table 6 assume that the fraction of completed homes with blown (loose-fill) attic insulation is 70%.[5] Thus, of the 1,325,000 homes completed in 2002, the working assumption is that 70%, or 927,500 of the houses had blown attic insulation.

The average house size is a measurement of living area, not attic space. A one story home would have attic space about equal to its living area. A two story home would have attic space about equal to 50% of its living area. A three story home would have attic space about equal to 33% of its living area. The data in Table 6 assume that the attic space is equal to 50%

[4] *Characteristics Of New Single-Family Homes (1987-2002)*, http://www.nahb.org/generic.aspx?sectionID=130&genericContentID=374
[5] Source ICAA

of the living area, or the equivalent of a two story house, on average. Thus in 2002, the 927,500 homes assumed to have blown insulation would have a living area of 2,151,800,000 ft^2. The attic space would be 50% of that, or 1,076 million ft^2.

Completed New Single Family Homes With Blown Insulation
70% Fraction With Blown Insulation
50% Attic Space Relative to Living Space

Table 6

	Total Completed (000s)	With Blown Insulation (000s)	Average Size (sq. ft.)	Area Blown (000,000 sq.ft.)
1992	964	675	2,095	707
1993	1,039	727	2,095	762
1994	1,160	812	2,100	853
1995	1,065	746	2,095	781
1996	1,129	790	2,120	838
1997	1,116	781	2,150	840
1998	1,160	812	2,190	889
1999	1,270	889	2,223	988
2000	1,242	869	2,266	985
2001	1,256	879	2,324	1,022
2002	1,325	928	2,320	1,076

Table 6: Approximately 70% of new single family homes have blown insulation. This table assumes that the effective average size of single family homes is that of a two story home, with the attic space being half the reported living space.

The U.S. Census Bureau also collects information on the completion of multifamily houses, which is the basis for Table 7.[6] The allowance of 40% attic space relative to living space is meant to accommodate multifamily homes that are taller than single family homes.

[6] *Characteristics Of Units Completed In Multifamily Buildings (1985-2002)*, http://www.nahb.org/generic.aspx?sectionID=130&genericContentID=375. Average size information was unavailable for 2002. The datum shown is the average size for 2001.

Completed New Multifamily Homes With Blown Insulation
70% Fraction With Blown Insulation
40% Attic Space Relative to Living Space

Table 7

	Total Completed (000s)	With Blown Insulation (000s)	Average Size (sq. ft.)	Area Blown (000,000 sq.ft.)
1992	194	136	1,040	56
1993	153	107	1,065	46
1994	187	131	1,035	54
1995	247	173	1,080	75
1996	284	199	1,070	85
1997	284	199	1,095	87
1998	314	220	1,065	94
1999	334	234	1,104	103
2000	332	232	1,114	104
2001	315	221	1,171	103
2002	323	226	1,171	106

Table 7: This table assumes that 70% of multifamily homes are fitted with blown insulation and that the attic space is 40% of the living space. This is equivalent to multifamily homes averaging a height that is slightly greater than two stories.

Each year, approximately 3.3 million homes are retrofitted with additional insulation.[7] Of those homes, about 46% are retrofitted with blown insulation.[8] The data for these retrofits are summarized in Table 8, Retrofitted Homes With Blown Insulation. The average size of these homes is assumed to be the simple average of the average size of single family homes and multifamily homes completed each year. Thus, the average size of 1,746 ft^2 in 2002 is the mean of 1,171 ft^2 for multifamily homes completed in 2002 and 2,320 ft^2 for single family homes completed in 2002.

[7] Source: ICAA
[8] Source: ICAA

Retrofitted Homes With Blown Insulation
46% Fraction With Blown Insulation
50% Attic Space Relative to Living Space
Assumes Average Size is Average of
Single and Multifamily Completions During the Year

Table 8

	Total Completed (000s)	With Blown Insulation (000s)	Average Size (sq. ft.)	Area Blown (000,000 sq.ft.)
1992	3,300	1,518	1,568	1,190
1993	3,300	1,518	1,580	1,199
1994	3,300	1,518	1,568	1,190
1995	3,300	1,518	1,588	1,205
1996	3,300	1,518	1,595	1,211
1997	3,300	1,518	1,623	1,231
1998	3,300	1,518	1,628	1,235
1999	3,300	1,518	1,664	1,263
2000	3,300	1,518	1,690	1,283
2001	3,300	1,518	1,748	1,326
2002	3,300	1,518	1,746	1,325

Table 8: Approximately 3.3 million homes are retrofitted with insulation each year, including approximately 1.518 million with blown insulation. The average size is assumed to be the mean of the average sizes for completed single family and multifamily homes.

The data from Tables 6, 7, and 8 are summarized in Table 9.

Area Blown With Loose-Fill Insulation
(000,000 sq.ft.)

Table 9

	New Single Family	Multi-Family	Retrofits	Total
1992	707	56	1,190	1,953
1993	762	46	1,199	2,007
1994	853	54	1,190	2,097
1995	781	75	1,205	2,061
1996	838	85	1,211	2,133
1997	840	87	1,231	2,158
1998	889	94	1,235	2,218
1999	988	103	1,263	2,354
2000	985	104	1,283	2,371
2001	1,022	103	1,326	2,451
2002	1,076	106	1,325	2,507

Table 9: The attic space blown with loose-fill insulation each year is the sum of the attic space of new single family homes, new multifamily homes, and retrofitted homes.

The Economic Effect of Attic Insulation Deficiency on Annual Heating Requirement on newly completed homes (new single family homes, new multifamily homes, and retrofitted homes) can be determined by combining the economic data in Table 5 with the area data in Table 9, as has been done in Table 10. The format of Table 10 is similar to the formats of Tables 1-5. Table 10 uses the unit costs of Table 5 with the size of the attics with blown insulation in 2002.

Table 2 established that a home with 1,000 ft^2 of attic space that was deficient 5°F- ft^2-hr/Btu of a specified insulation level of 30°F- ft^2-hr/Btu would incur added annual heating costs of $7.32, based on a population weighted average. Similarly, Table 4 established that a home with 1,000 ft^2 of attic space that was deficient 5°F- ft^2-hr/Btu of a specified insulation level of 30°F- ft^2-hr/Btu would incur added annual cooling costs of $2.29.

The heating and cooling effects were summarized in Table 5 which shows that a house with 1,000 ft^2 of attic space that was deficient 5°F- ft^2-hr/Btu of a specified insulation level of 30°F- ft^2-hr/Btu would incur added annual heating and cooling costs of $9.61. For the 2,507 million ft^2 of attic space completed and retrofitted in 2002 with blown insulation, that would be

an additional annual cost of $24,000,000. This number is shown in Table 10 at the intersection of the R30 column and the R5 row.

Economic Effect of Attic Insulation Deficiency on Annual Heating and Cooling Requirement (Million Dollars/Year) Uses Population Weighted National Average 4,575 Heating Degree Days 1,193 Cooling Degree Days $10.00 Delivered Cost of Heat ($/MMBtu) $12.00 Delivered Cost of Cooling ($/MMBtu) Year 2002 Completions Including Retrofits

Table 10

		Desired Insulation Level				
		R20	**R25**	**R30**	**R35**	**R40**
Insulation Deficiency Level	**R1**	$10	$6	**$4**	$3	$2
	R3	$32	$20	**$13**	$10	$7
	R5	**$60**	**$36**	***$24***	**$17**	**$13**
	R10	$181	$96	**$60**	$41	$30

Table 10: The total annual cost associated with an insulation deficiency depends on the affected area, the cost of energy, the amount of the deficiency, and the targeted insulation level.

POTENTIAL BENEFITS RESULTING FROM AMENDING R-VALUE RULE

The proposed amendments to Rule 460 when adopted will lessen Attic Insulation Deficiency.[9] Table 11 provides a range of estimates of reduced annual costs of heating and cooling homes that the proposed Rule would have resulted in during the period 1992 to 2002. Table 11 combines data from Table 5 with the information in Table 9.

For newly completed homes, both single family and multifamily, Table 11 takes from Table 5 the annual heating and cooling costs when an attic is deficient 5°F- ft^2-hr/Btu of a specified insulation level of 30°F- ft^2-hr/Btu. This is an annual cost of $9.61 per 1000 ft^2. This annual cost is assumed to be applicable to new homes completed during the year, using the data

[9] Proposed amendments to Rule 460 (with proposed minor modifications by ICAA) as related to adoption of ASTM C 1374 as discussed supra.

from Table 9 (the area of attic space for new homes completed each year with blown insulation, both single family homes and multifamily homes). These areas, 1,076 million ft^2 and 106 million ft^2, or a total of 1,182 million ft^2, are evaluated at the $9.61 per 1000 ft^2 of Table 5 to determine the annual cost of the deficiency in insulation levels for new construction, $11,359,020 for 2002 completions.

For retrofits, Table 11 takes from Table 5 the annual heating and cooling costs when an attic is deficient 5°F- ft^2-hr/Btu of a specified insulation level of 40°F- ft^2-hr/Btu. This is an annual cost of $5.15 per 1000 ft^2. This annual cost is assumed to be applicable to retrofits completed during the year, using the data from Table 9 (the area of attic space for retrofits completed each year with blown insulation). These areas, 1,325 million ft^2 in 2002, are evaluated at the $5.15 per 1000 ft^2 of Table 5 to determine the annual cost of the deficiency in insulation levels for retrofits, $6,823,000 for 2002 retrofits.

The right side of Table 11 shows the annual savings that could have been produced by the proposed amendments to the Rule if it had been successful in eliminating various portions of the annual cost of the deficiency in insulation levels.

Table 12 accumulates the data in Table 11 to show the cumulative savings from the proposed amendments to the Rule if it had been in place effective with housing completions in 1992 through 2002. For instance, Table 11 shows that a 100% effective Rule would have reduced annual heating and cooling costs for homes completed in 1992 by $13.46 million. A 50% effective Rule would have reduced annual heating costs for homes completed in 1992 by $6.73 million. The cumulative savings in 1992 would have been the savings associated with homes completed in 1992, or $6.73 million, the number in the first row of Table 12.

The Rule, if implemented in time to be effective for completions in 1992, would have reduced annual heating and cooling costs for homes completed in 1993 by $6.97 million. The savings in 1993 would have been the savings associated with homes completed in 1992 plus the savings associated with homes completed in 1993, or $6.73 million plus $6.97 million, a total of $13.70 million. These savings are in addition to the $6.73 million savings in 1992. Thus, cumulative savings in 1993 would have been $20.43 million. Note that there is a slight difference due to the rounding of some numbers for presentation purposes.

Similarly, Table 11 shows that the Rule, if it had been 50% effective for housing completions in 1994, would have reduced annual heating and cooling costs by $7.42 million. The annual savings in 1994 would thus have been the sum of the annual savings for housing completions in 1992, 1993, and 1994, or the sum of $6.73 million, $6.97 million, and $7.42 million, an annual savings in 1994 of $21.12 million. The cumulative savings would be the 1994 annual savings of $21.12 million plus the cumulative savings of 1993 of $20.43 million, for a cumulative savings through 1994 of $41.55 million.

Under this procedure, the cumulative savings to the nation's home owners of adopting the proposed amendments to the Rule could have been $492.61 million for the period from 1992 through 2002.

Effect on Annual Heating and Cooling Requirement of Eliminating Some of the Attic Insulation Deficiency
(Million Dollars/Year)
Uses Population Weighted National Average
4,575 Heating Degree Days
1,193 Cooling Degree Days
$10.00 Delivered Cost of Heat ($/MMBtu)
$12.00 Delivered Cost of Cooling ($/MMBtu)
R5 Deficiency on a Desired R30 Insulation Level For New Dwellings
R5 Deficiency on a Desired R40 Insulation Level For Retrofits

Table 11

	Area Blown (000,000 sq.ft.)	Annual Cost of Deficiency ($000,000)	Portion of the Deficiency Eliminated									
			5%	10%	15%	20%	25%	30%	35%	40%	45%	50%
1992	1,953	$13.46	$0.67	$1.35	$2.02	$2.69	$3.37	$4.04	$4.71	$5.38	$6.06	$6.73
1993	2,007	$13.93	$0.70	$1.39	$2.09	$2.79	$3.48	$4.18	$4.88	$5.57	$6.27	$6.97
1994	2,097	$14.84	$0.74	$1.48	$2.23	$2.97	$3.71	$4.45	$5.19	$5.94	$6.68	$7.42
1995	2,061	$14.43	$0.72	$1.44	$2.16	$2.89	$3.61	$4.33	$5.05	$5.77	$6.49	$7.21
1996	2,133	$15.10	$0.76	$1.51	$2.27	$3.02	$3.78	$4.53	$5.29	$6.04	$6.80	$7.55
1997	2,158	$15.25	$0.76	$1.52	$2.29	$3.05	$3.81	$4.57	$5.34	$6.10	$6.86	$7.62
1998	2,218	$15.80	$0.79	$1.58	$2.37	$3.16	$3.95	$4.74	$5.53	$6.32	$7.11	$7.90
1999	2,354	$16.99	$0.85	$1.70	$2.55	$3.40	$4.25	$5.10	$5.95	$6.80	$7.65	$8.49
2000	2,371	$17.07	$0.85	$1.71	$2.56	$3.41	$4.27	$5.12	$5.97	$6.83	$7.68	$8.53
2001	2,451	$17.64	$0.88	$1.76	$2.65	$3.53	$4.41	$5.29	$6.17	$7.06	$7.94	$8.82
2002	2,507	$18.18	$0.91	$1.82	$2.73	$3.64	$4.54	$5.45	$6.36	$7.27	$8.18	$9.09

Table 11: The total annual cost associated with an insulation deficiency depends on the affected area, the cost of energy, the amount of the deficiency, and the targeted insulation level. Adoption of proposed amendments to the Rule would have eliminated some fraction of the deficiency and saved consumers significant annual heating and cooling expenditures.

Cumulative Effect of Eliminating Some of the Attic Insulation Deficiency
(Million Dollars)
Uses Population Weighted National Average
4,575 Heating Degree Days
1,193 Cooling Degree Days
$10.00 Delivered Cost of Heat ($/MMBtu)
$12.00 Delivered Cost of Cooling ($/MMBtu)
R5 Deficiency on a Desired R30 Insulation Level For New Dwellings
R5 Deficiency on a Desired R40 Insulation Level For Retrofits

Table 12

	Portion of the Deficiency Eliminated									
	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%
1992	$0.67	$1.35	$2.02	$2.69	$3.37	$4.04	$4.71	$5.38	$6.06	$6.73
1993	$2.04	$4.09	$6.13	$8.17	$10.21	$12.26	$14.30	$16.34	$18.39	$20.43
1994	$4.15	$8.31	$12.46	$16.62	$20.77	$24.93	$29.08	$33.24	$37.39	$41.55
1995	$6.99	$13.98	$20.96	$27.95	$34.94	$41.93	$48.91	$55.90	$62.89	$69.88
1996	$10.58	$21.15	$31.73	$42.30	$52.88	$63.46	$74.03	$84.61	$95.18	$105.76
1997	$14.93	$29.85	$44.78	$59.71	$74.63	$89.56	$104.49	$119.41	$134.34	$149.27
1998	$20.07	$40.13	$60.20	$80.27	$100.34	$120.40	$140.47	$160.54	$180.61	$200.67
1999	$26.06	$52.12	$78.17	$104.23	$130.29	$156.35	$182.40	$208.46	$234.52	$260.58
2000	$32.90	$65.80	$98.70	$131.61	$164.51	$197.41	$230.31	$263.21	$296.11	$329.01
2001	$40.63	$81.25	$121.88	$162.51	$203.13	$243.76	$284.39	$325.02	$365.64	$406.27
2002	$49.26	$98.52	$147.78	$197.05	$246.31	$295.57	$344.83	$394.09	$443.35	$492.61

Table 12: The total annual cost associated with an insulation deficiency depends on the affected area, the cost of energy, the amount of the deficiency, and the targeted insulation level. Adoption of proposed amendments to the Rule would have eliminated some fraction of the deficiency and saved consumers significant annual heating and cooling expenditures. The data in this table represent an annual accumulation of the total if the Rule had been effective as of 1992.

GREENHOUSE GAS EMISSIONS

The predominant heating mechanism in the U.S. is natural gas heating systems. Natural gas produces approximately 14.47 Kilograms of carbon equivalents for every MMBtu of heat. Other significant heating mechanisms produce even more carbon equivalents for every MMBtu of heat, with the exception of nuclear power and hydro power, which are not marginal methods for producing electricity. Thus, if the amount of electricity used to heat homes changed there would be no change in use of nuclear power and hydro power to produce the electricity.

Table 13 is the Heating Effect of Attic Insulation Deficiency on Greenhouse Gas Emissions based on the Effect of Attic Insulation Deficiency on Annual Heating Requirement of Table 1 with the energy requirements converted to Kilograms of Carbon Equivalent under the assumption that each MMBtu of energy will release 14.47 Kilograms of carbon equivalents.

Heating Effect of Attic Insulation Deficiency on Greenhouse Gas Emissions
(Kilograms of Carbon Equivalent/Year/1000 Square Feet)
Assumes All Heat From Natural Gas
4,575 Heating Degree Days
14.47 Kgce/MMBtu

Table 13

		Desired Insulation Level				
		R20	**R25**	**R30**	**R35**	**R40**
Insulation Deficiency Level	**R1**	4.18	2.65	**1.83**	1.34	1.02
	R3	14.02	8.67	**5.88**	4.26	3.22
	R5	**26.48**	**15.89**	***10.59***	**7.57**	**5.67**
	R10	79.44	42.37	**26.48**	18.16	13.24

Table 13: The increased heating requirements associated with a deficiency of attic insulation will increase the amount of greenhouse gases that are released to meet the national home heating requirement.

Table 14 is similar to Table 13 but is the Cooling Effect of Attic Insulation Deficiency on Greenhouse Gas Emissions. Table 13 is based on Table 3, but with the with the energy requirements converted to Kilograms of Carbon Equivalent under the assumption that each MMBtu of energy will release 20.00 Kilograms of carbon equivalents. The primary marginal fuels for producing electricity are coal and natural gas. Coal produces about twice as much greenhouse gases per unit of heat as does natural gas. We have used 20.00 Kilograms as a reasonable estimate of what that conversion factor might be.

Cooling Effect of Attic Insulation Deficiency on Greenhouse Gas Emissions
(Kilograms of Carbon Equivalent/Year/1000 Square Feet)
Assumes Most Cooling From Natural Gas, Rest from Coal
1,193 Cooling Degree Days
20.00 Kgce/MMBtu

Table 14

		Desired Insulation Level				
		R20	**R25**	**R30**	**R35**	**R40**
Insulation Deficiency Level	**R1**	1.51	0.95	**0.66**	0.48	0.37
	R3	5.05	3.12	**2.12**	1.53	1.16
	R5	**9.54**	**5.73**	***3.82***	**2.73**	**2.05**
	R10	28.63	15.27	**9.54**	6.54	4.77

Table 14: The increased heating requirements associated with a deficiency of attic insulation will increase the amount of greenhouse gases that are released to meet the national home cooling requirement.

The data in Tables 13 and 14 are combined to determine the total Effect of Attic Insulation Deficiency on Greenhouse Gas Emissions in Table 15.

Effect of Attic Insulation Deficiency on Greenhouse Gas Emissions
(Kilograms of Carbon Equivalent/Year/1000 Square Feet)
Assumes Most Cooling From Natural Gas, Rest from Coal
4,575 Heating Degree Days
1,193 Cooling Degree Days
14.47 Kgce/MMBtu for Heating
20.00 Kgce/MMBtu for Cooling

Table 15

		Desired Insulation Level				
		R20	**R25**	**R30**	**R35**	**R40**
Insulation Deficiency Level	**R1**	5.69	3.60	**2.48**	1.82	1.39
	R3	19.07	11.79	**8.01**	5.79	4.38
	R5	**36.02**	**21.61**	***14.41***	**10.29**	**7.72**
	R10	108.07	57.64	**36.02**	24.70	18.01

Table 15: The increased heating requirements associated with a deficiency of attic insulation will increase the amount of greenhouse gases that are released to meet the national home heating and cooling requirement.

Table 16 shows the Effect of Attic Insulation Deficiency on Greenhouse Gas Emissions for year 2002 completions including retrofits. It is based on the same principles as Table 10.

Effect of Attic Insulation Deficiency on Greenhouse Gas Emissions
(Thousand Metric Tons of Carbon Equivalent/Year)
Assumes All Heat From Natural Gas
4,575 Heating Degree Days
1,193 Cooling Degree Days
14.47 Kgce/MMBtu for Heating
20.00 Kgce/MMBtu for Cooling
Year 2002 Completions Including Retrofits

Table 16

		Desired Insulation Level				
		R20	**R25**	**R30**	**R35**	**R40**
Insulation Deficiency Level	**R1**	14.26	9.03	**6.23**	4.55	3.47
	R3	47.81	29.55	**20.07**	14.51	10.98
	R5	**90.30**	**54.18**	***36.12***	**25.80**	**19.35**
	R10	270.90	144.48	**90.30**	61.92	45.15

Table 16: The increased heating requirements associated with a deficiency of attic insulation will increase the amount of greenhouse gases that are released to meet the national home heating and cooling requirement.

Table 17 shows the Effect of Eliminating Some of the Attic Insulation Deficiency On Greenhouse Gas Emissions under the same assumptions that governed Table 12. Table 18 shows the Cumulative Effect of Eliminating Some of the Attic Insulation Deficiency on Greenhouse Gas Emissions.

Effect of Eliminating Some of the Attic Insulation Deficiency on Greenhouse Gas Emissions
(Thousand Metric Tons of Carbon Equivalent/Year)
Assumes All Heat From Natural Gas
4,575 Heating Degree Days
1,193 Cooling Degree Days
14.47 Kgce/MMBtu for Heating
20.00 Kgce/MMBtu for Cooling
R5 Deficiency on a Desired R30 Insulation Level For New Dwellings
R5 Deficiency on a Desired R40 Insulation Level For Retrofits
Table 17

	Area Blown (000,000 sq.ft.)	Greenhouse Gas Emissions Due to Deficiency of Insulation (KMTCE)	Portion of the Shortfall Eliminated									
			5%	10%	15%	20%	25%	30%	35%	40%	45%	50%
1992	1,953	50.59	2.53	5.06	7.59	10.12	12.65	15.18	17.71	20.24	22.77	19.20
1993	2,007	52.37	2.62	5.24	7.86	10.47	13.09	15.71	18.33	20.95	23.57	19.89
1994	2,097	55.77	2.79	5.58	8.37	11.15	13.94	16.73	19.52	22.31	25.10	21.23
1995	2,061	54.22	2.71	5.42	8.13	10.84	13.55	16.27	18.98	21.69	24.40	20.61
1996	2,133	56.76	2.84	5.68	8.51	11.35	14.19	17.03	19.86	22.70	25.54	21.60
1997	2,158	57.31	2.87	5.73	8.60	11.46	14.33	17.19	20.06	22.92	25.79	21.81
1998	2,218	59.40	2.97	5.94	8.91	11.88	14.85	17.82	20.79	23.76	26.73	22.62
1999	2,354	63.85	3.19	6.39	9.58	12.77	15.96	19.16	22.35	25.54	28.73	24.35
2000	2,371	64.14	3.21	6.41	9.62	12.83	16.03	19.24	22.45	25.66	28.86	24.46
2001	2,451	66.30	3.31	6.63	9.94	13.26	16.57	19.89	23.20	26.52	29.83	25.28
2002	2,507	68.32	3.42	6.83	10.25	13.66	17.08	20.50	23.91	27.33	30.74	26.07

Cumulative Effect of Eliminating Some of the Attic Insulation Deficiency on Greenhouse Gas Emissions
(Thousand Metric Tons of Carbon Equivalent)
Assumes All Heat From Natural Gas
4,575 Heating Degree Days
1,193 Cooling Degree Days
14.47 Kgce/MMBtu for Heating
20.00 Kgce/MMBtu for Cooling
R5 Deficiency on a Desired R30 Insulation Level For New Dwellings
R5 Deficiency on a Desired R40 Insulation Level For Retrofits
Table 18

	Portion of the Shortfall Eliminated									
	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%
1992	2.53	5.06	7.59	10.12	12.65	15.18	17.71	20.24	22.77	25.30
1993	7.68	15.36	23.03	30.71	38.39	46.07	53.74	61.42	69.10	76.78
1994	15.61	31.23	46.84	62.46	78.07	93.69	109.30	124.92	140.53	156.15
1995	26.26	52.53	78.79	105.05	131.31	157.58	183.84	210.10	236.36	262.63
1996	39.75	79.50	119.24	158.99	198.74	238.49	278.24	317.99	357.73	397.48
1997	56.10	112.20	168.30	224.40	280.50	336.60	392.69	448.79	504.89	560.99
1998	75.42	150.84	226.26	301.68	377.10	452.52	527.94	603.36	678.78	754.20
1999	97.93	195.87	293.80	391.74	489.67	587.60	685.54	783.47	881.41	979.34
2000	123.65	247.31	370.96	494.62	618.27	741.93	865.58	989.24	1,112.89	1,236.54
2001	152.69	305.38	458.07	610.76	763.45	916.14	1,068.83	1,221.52	1,374.21	1,526.90
2002	185.14	370.28	555.42	740.57	925.71	1,110.85	1,295.99	1,481.13	1,666.27	1,851.41