Hampton Newsome, Attorney September 6th, 2016
Bureau of Consumer Protection
Federal Trade Commission
600 Pennsylvania Avenue NW
Washington, DC 20580.

RE: 16 CFR part 460—R-value Rule Review, File No. R811001

The FTC required R-value is essential to predict energy savings and compare products. For consumers, the primary benefit of insulation is a reduction in heat flow and energy use in buildings; and then the direct correlation in the reduced costs of their energy bills. Lacking a common metric provided by the R-value rule consumers might have to rely on exaggerated and inconsistent claims of insulation performance.

The "R-value Rule" should be improved. Labeled R-values should better reflect actual R-values in market. Installation instructions should be provided to the users, especially the "do it yourself" (DIY) users.

This comment focuses on fiberglass batts. Why focus on fiberglass batts? Fiberglass batts are the most common form of insulation. It seems prudent to start with the type of insulation with the largest market share. Other types of insulation, such as spray foam, foam sheathing, cellulose and blown fiberglass should examined and tested too.

Some labeled R-values seem high based on testing. This commenter had 6 examples of fiberglass batts tested by accredited laboratories. All products were purchased by the commenter "off the shelf" of a big box stores. The labeled are compared to the tested R-values in Table 1. The tested R-values were always below the labeled R-values. All products tested at least R1 below the labeled R-value. Some products tested at R2 or more below the label. Test results are submitted with this comment. (Note 1 has more details of the testing.)

Table 1. Labeled R-value vs. Tested R-value

Product	% of Label	Labeled R-value	Tested R-value
R15 roll	93%	R15	R13.95
R19 roll	87% / 92%*	R19	R16.56
R19 batt	87% / 92%*	R19	R16.51
R21 roll	92%	R21	R19.24
R30 roll	92%	R30	R27.47
R38 batt	95%	R38	R36.00

* Discussed below. First value is % of R19.
Second value is % of R18. Both presume a 2x6 wall cavity.

The tested R-values above suggest the labeled R-values are overstated. There are too few tests to conclude what the revised R-value should be. It is possible, but unlikely, that all six fiberglass products tested by this commenter were anomalies. It is more likely that testing products "off the shelf" gives different results for some reason.

Another source for tested R-values got higher R-values. The "Thermal Metric Project" tested fiberglass insulation as part of their project. The six tests of fiberglass showed fiberglass that averaged about 97% of the labeled R-value. (See note #2.) Insulation tested was received from the manufacturer, rather than purchased on the open market.

If one presumes all reported tests by accredited laboratories are correct, then what might account for the difference? Manufacturers that supply the product for testing could be selecting better examples of their product from their production? Fiberglass is highly compressed and bound in packaging for weeks to months before use; perhaps it does not recover its full R-value?

Further independent testing of R-values is needed. What is reported here is suggestive, not conclusive. The additional testing should be based solely on randomly selected products purchased by third parties in the open market and tested in accredited labs. FTC testing should require an independent third party test of insulation products purchased in the market place.

If further tests show compression for weeks or months partly reduces the R-value, then the FTC-sanctioned R-values should reflect the R-value that reaches the market. For example, testing might require fiberglass that was bound and stored for a specific period of time. Without further testing this is all speculation.

R19 insulation is a special case. The R19 insulation is marketed as a wall and floor product. Although manufactures state that the R19 is for walls, R19 does not fit into a 2x6 wall cavity. All manufacturers make R19 insulation that is 6.25 inches thick, but is compressed to 5.5 inches when installed in a 2x6 wall cavity. Compressed insulation yields an R-value below the labeled R-value. Manufacturer's packaging indicates a loss of R1 when R19 is used in walls, but the lower R-value is in much smaller print. The large bold label is "R19". Sales literature such as that produced by retail stores, lists it as R19. Consumers would likely presume it is R19.

This commenter is not aware of any other insulation product that is advertised for a particular use (2x6 wall cavities) but produced in a size that does not fit into its use. If the manufacturer markets the R19 insulation for walls and floor, then the FTC rule should require both R18 and R19 be prominently featured on the label with the same font size for the R18 and the R19. Alternately a manufacturer could make an R19 batt that fits into a 2x6 cavity. R21 is already manufactured for a 2x6 cavity, so making R19 wall insulation that fits into a 2x6 cavity would not demand any new technology.

That R19 is really R18 in the walls is seldom noted at all in short commercial descriptions of product such as Home Depot, Lowes or Amazon would give. Consumers buying R19 wall insulation are getting the wrong information. To quote the FTC web

site: "… if an advertisement contains an R-value, it must disclose the type of insulation being sold and the thickness needed to get that R-value …". R19 insulation sold for use in walls does not comply unless the R1 reduction is acknowledged in the ad. The correction could as simple as saying "R19 in floors / R18 in 2x6 wall cavities".

Again, this comment uses fiberglass batts as an example. Other types of insulation should be similarly examined to verify that "real world" R-values are represented by the labeled R-values.

Insulation is often installed poorly. Insulation needs instructions. Insulation is often installed poorly. (The rest of this comment is not specific to fiberglass.) Insulation is often installed incorrectly, which can greatly degrade its performance. Individual packages of insulation lack installation directions. Most DIY consumers do not know how to install insulation correctly and therefore will get poorer performance and higher energy bills. Individual packages of insulation should include or reference instructions for correct installation.

A recent DOE field study of many houses in six states suggests insulation products are often poorly installed. (See note #3.) Insulation installation was examined and graded. Grade I insulation could be considered correctly installed insulation. About 45% of the graded insulation was judged sub-Grade I (Grades II and III).

RESNET (Residential Energy Services Network) has prescribed assumptions for characterizing Grade II and Grade III insulation, which are adapted here. (See note 4.) Grade II is represented by 2% missing insulation and Grade III is represented by 5% missing insulation. The table shows how lower Grades degrade insulation performance. The tables uses U-factors from REScheck software (See note 5.) Grade II and Grade III insulation are significantly worse that Grade I. These are only general estimates but illustrate the dramatic impact of poor insulation installation, especially at higher R-values. In the table the last two columns, increased U-factor, represent how much heat flow would be increased

Table 2. Impact of insulation grade on U-factor

Insulation	REScheck U-factor	Grade II- 2% missing	Grade III- 5% missing	Grade II Increased U-factor	Grade III Increased U-factor
R21 walls 16 in oc	0.057	0.061	0.066	6%	16%
R13 walls 16 in oc	0.082	0.085	0.090	4%	10%
R0 walls	0.238				
R38 ceiling	0.030	0.041	0.057	36%	90%
R0 ceiling	0.568				

It is a given that manufacturers want their product installed correctly. However lacking instructions the user, especially the DIY user, does not know what is correct. Small areas of incorrectly installed insulation can have big impact. The Grade II and III penalty is high, as shown in Table 2 above. One practical way to support correct installation is to supply instructions, especially for those products that may be purchased by the DIY consumer. Instructions could be attached to the packaging, on the packaging or on a website referenced by the packaging. Manufacturers want their products installed correctly; however, if correct installation instructions are not supplied the user may not know what correct is.

Besides the manufacturer product-specific instructions, the following should be included specifications for Grade I insulation should be included with or in the instructions. The following is taken from ICC 700. (See note 6.) Where a requirement did not apply to the product it could be omitted.
"--Air-permeable insulation is enclosed on all six sides and is in substantial contact with the sheathing material on one or more sides (interior or exterior) of the cavity. Air permeable insulation in ceilings is not required to be enclosed when the insulation is installed in substantial contact with the surfaces it is intended to insulate.
--Cavity insulation uniformly fills each cavity side-to-side and top-to-bottom, without substantial gaps or voids around obstructions (such as blocking or bridging).
--Cavity insulation compression or incomplete fill amounts to 2 percent or less, presuming the compressed or incomplete areas are a minimum of 70 percent of the intended fill thickness; occasional small gaps are acceptable.
--Exterior rigid insulation has substantial contact with the structural framing members or sheathing materials and is tightly fitted at joints.
--Cavity insulation is split, installed, and/or fitted tightly around wiring and other services.
--Exterior sheathing is not visible from the interior through gaps in the cavity insulation.
–Faced batt insulation is permitted to have side-stapled tabs, provided the tabs are stapled neatly with no buckling, and provided the batt is compressed only at the edges of each cavity, to the depth of the tab itself."

Insulation packages should be required to include or reference DIY instructions that are understandable by the non-professional installer. A good example of these instructions that would work for either insulation professionals or DIY consumer is Owens Corning's brochure about achieving Grade I with fiberglass. The pictures of proper and improper fiberglass insulation installation on pages 7 through 11 are particularly well done for the DIY consumer.
http://www2.owenscorning.com/literature/pdfs/GradeOneWithFiberglassBatts.pdf

Thank you for the chance to comment

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Notes:

Note 1. How were the tests reported here done? Material from two insulation manufacturers was tested. The commenter chose the products off the shelf from two big box stores. The insulation was shipped directly to a laboratory accredited to do ASTM C 581 testing. Each batt/roll was tested three times in accordance with ASTM C 581. The QAI test was paid for by Icynene, but Icynene did not specify what was tested, how the samples were collected, ever touch the samples or approve this comment. (The R30 and R38 tests in the QAI test were ignored because they were not tested a full thickness.) The commenter paid for the R&D Services testing.

Note 2. The Thermal Metric Project report can be found at
http://buildingscience.com/documents/special/thermal-metric-documents/thermal-metric-summary-report
Averaging the "% of label" from that report would yield a tested R-value that is 97% of the labeled value. The tested value for 75 F is the relevant test value.
Specific values are from
Table 3.2.1, page 62, R13 = 3.5 inches * 3.53 R-value/inch = R12.355
Table 3.3.1, page 71, R13 = 3.5 inches * 3.59 R-value/inch = R12.565
Table 3.7.1, page 117, R13 = 3.5 inches * 3.61 R-value/inch = R12.635
Average of three R13 values above is R12.52 or 96% of labeled R-value
Table 1, page after 137, R15 = 3.5 inches * 4.17 R-value/inch = R14.595 = 97%
Table 3.8.1, page 126, R21 = 5.5 inches * 3.76 R-value/inch = R20.68 = 98%

Note 3. The publicly available data used here is from DOE's Residential Field Study Dataset, available at https://www.energycodes.gov/residential-energy-code-field-study. That dataset was downloaded September 3, 2016. The field study data is from six states – Alabama, Kentucky, Maryland, North Carolina, Pennsylvania, and Texas. This study graded insulation installation, with grades I, II and III. These grades are used in RESNET's inspection and in ICC 700. The most concise presentation of "Grade I" insulation is in ICC 700 National Green Building Standard, Section 701.4.3.2.1. Grade I insulation is needed to get the labeled performance from insulation. Grade II and III are more poorly installed insulation resulting in higher energy use.

Note 4. Representing Grade II as 2% of the area uninsulated and Grade III as 5% of the area uninsulated is based on:
RESNETS's RESNET Mortgage Industry National HERS Standards, Section 303.4.1.4.2, page 3-21.
http://www.resnet.us/standards/RESNET_Mortgage_Industry_National_HERS_Standards.pdf
and
Standard for the Calculation and Labeling of the Energy Performance of Low-Rise Residential Buildings using the HERS Index, ANSI/RESNET/ICC 301-2014,
page 21, Section 4.2.2.2.2 titled "Insulation Assessment"
http://www.resnet.us/standards/ANSI-RESNET_301-2014.pdf

Note 5. The U-factors were taken from REScheck web based software. A 16 inch on center wood frame wall and a "flat or scissor truss" were assumed with the 2015 IECC code specified. The software can be found at:
https://energycode.pnl.gov/REScheckWeb

Note 6. The most concise presentation of "Grade I" insulation is in ICC 700 National Green Building Standard, Section 701.4.3.2.1. Grade I insulation is needed to get the labeled performance from insulation, a portion of which is recommended for inclusion with or reference by individual packages of insulation.