



Builders Statement

InsulSafe® SP Fiber Glass Blowing Insulation for Minnesota

Stated R-Values are as measured in accordance with FTC regulations. Depending on installed density, thickness, attic framing and presence of batt insulation, R-Values may be reduced at cold temperatures due to convective air movement in the insulation. At winter design conditions, the cold temperature R-Value loss of InsulSafe® SP Fiber Glass Insulation in Minneapolis, MN, for example, is 2% at R-49 (CertainTeed's recommended R-Value for Minnesota) and 0% at R-38. As another example, in Bemidji, MN, the R-Value loss of InsulSafe SP at winter design conditions is 18% at R-49 and 16% at R-38. R-Values are determined in accordance with ASTM C 687 and C 518. This insulation conforms to ASTM C 764 as Type I insulation and ASTM C1373 Standard Practice for Determination of Thermal Resistance of Attic Insulation Systems Under Simulated Winter Conditions.

"Winter design conditions" refers to the temperature which has been equaled or exceeded 99% of the winter; by definition, temperatures colder than design conditions occur only 1% of the time in winter. Thus, the average winter temperature is much warmer than the winter design temperature. For example, Minneapolis, with a winter design temperature of -16F°, has an average winter temperature of +16F°.

Homeowner Name / Jobsite Name

Home Address

Installer/Contractor (sign)

Company Name

Date

Builder (sign)

Company Name

Date

Inspected By (sign if required)

Date

Standard coverage chart for use at Winter Region Temperatures of -15°F to +75°F

R-VALUE To obtain a Thermal Resistance (R) of:	BAGS PER 1,000 SQ. FT. Bags per 1,000 sq. ft. of net area	MAXIMUM SQ. FT. PER BAG Contents of bag should not cover more than: (sq. ft.)	MINIMUM WEIGHT POUNDS PER SQ. FT. Of installed insulation should not be less than: (lbs.)	MINIMUM THICKNESS Should not be less than: (in.)
60	31.4	31.9	0.972	22.00
49	25.2	39.7	0.780	18.50
44	22.4	44.6	0.695	16.75
38	19.1	52.5	0.591	14.50
30	14.9	67.1	0.462	11.75
26	12.8	77.9	0.398	10.25
22	10.8	92.9	0.334	8.75
19	9.3	107.4	0.289	7.75
13	6.2	161.7	0.192	5.25
11	5.3	190.5	0.163	4.50

R-Values are determined in accordance with ASTM C687 and C518. Complies with ASTM C764 as Type 1 pneumatic Application.

To maintain label R-Values at Winter Design Conditions in colder regions, extra insulation can be installed in accordance with this chart.

Winter Design Temp. Degrees F	R-30		R-38		R-44		R-49		R-60	
	Extra Depth, Inches	Extra Bags Per 1000 Sq. Ft.	Extra Depth, Inches	Extra Bags Per 1000 Sq. Ft.	Extra Depth, Inches	Extra Bags Per 1000 Sq. Ft.	Extra Depth, Inches	Extra Bags Per 1000 Sq. Ft.	Extra Depth, Inches	Extra Bags Per 1000 Sq. Ft.
-16 to -19	0	0.0	0	0.0	0	0.0	1/2	0.9	1	1.9
-20 to -23	0	0.0	1/4	0.6	1	1.9	1 1/2	2.7	2	3.7
-24 to -28	0	0.0	1 3/4	2.7	2 1/4	4.0	2 3/4	4.9	3 1/4	5.8
-29 and colder	3/4	1.0	2 1/2	3.9	3 1/4	5.3	3 1/2	6.2	4	7.1

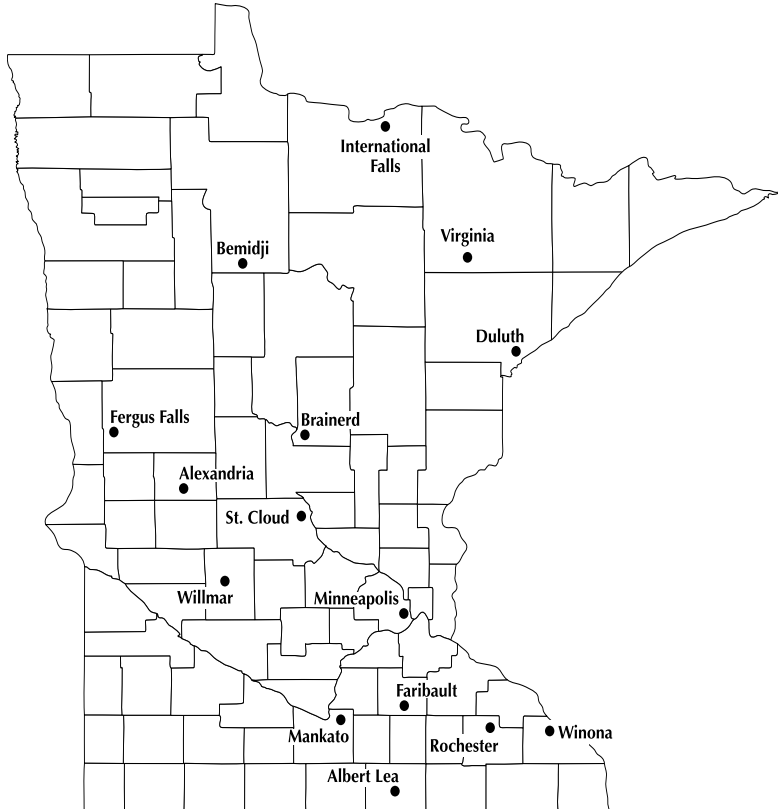
See Minnesota map and Winter Design Temperatures Chart for selected Minnesota cities on the back of this sheet.

	R-VALUE	THICKNESS	AREA (SQ. FT.)	INSULSAFE SP FOR MINNESOTA	BAGS USED	BATTS/ROLLS (✓)
CEILINGS						
WALLS						
FLOORS						

THERMAL PERFORMANCE—ATTIC BLOWING APPLICATION

- In accordance with the chart above, you must install the minimum number of bags per 1,000 sq. ft. of net area for each R-Value listed.
- The maximum net coverage must not exceed that specified for each R-Value.
- The installed insulation must be at or above the specified minimum installed thickness for each R-Value.
- Failure to install the required minimum weight per sq. ft. of insulation at or above the initial installed thickness will result in reduced R-Value.
- This product should not be mixed with other blown insulations or the thermal claims will become invalid.
- R-Values are determined in accordance with ASTM C 687 and C 518. Complies with ASTM C 764 as Type I insulation. "R" means resistance to heat flow. The higher the R-Value, the greater the insulating power. To get the desired R-Value, it is essential that the insulation be installed properly.

DANGER: RECESSED LIGHT FIXTURES—TO PREVENT OVERHEATING, DO NOT INSULATE ON TOP OR WITHIN 3" OF SUCH DEVICES. DOES NOT APPLY TO TYPE IC LIGHT FIXTURES OR TO FLUORESCENT FIXTURES WITH THERMALLY PROTECTED BALLASTS.



Winter Design Temperatures

R-Value	Temperature °F
Winona	-14
Willmar	-15
St. Cloud	-15
Minneapolis	-16
Mankato	-17
Rochester	-17
Albert Lea	-17
Faribault	-17
Brainerd	-20
Duluth	-21
Fergus Falls	-21
Alexandria	-22
Virginia	-25
International Falls	-29
Bemidji	-31

Minnesota Energy Code
Chapter 7672 (Effective 4-15-00)

This is CertainTeed Corporation **InsulSafe[®] SP**
Fiber Glass Blowing Insulation for Minnesota

COVERAGE CHART—OPEN CAVITY (ATTIC) APPLICATION BLOW

The following thermal performances are achieved at the thicknesses, weights and coverages specified when insulation is installed with pneumatic equipment in a horizontal open blow application.

R-VALUE To obtain a Thermal Resistance (R) of:	BAGS PER 1,000 SQ. FT. Bags per 1,000 sq. ft. of net area	MAXIMUM SQ. FT. PER BAG Contents of bag should not cover more than: (sq. ft.)	MINIMUM WEIGHT POUNDS PER SQ. FT. of installed insulation should not be less than: (lbs.)	MINIMUM THICKNESS Should not be less than: (in.)
60	31.4	31.9	0.972	22.00
49	25.2	39.7	0.780	18.50
44	22.4	44.6	0.695	16.75
38	19.1	52.5	0.591	14.50
30	14.9	67.1	0.462	11.75
26	12.8	77.9	0.398	10.25
22	10.8	92.9	0.334	8.75
19	9.3	107.4	0.289	7.75
13	6.2	161.7	0.192	5.25
11	5.3	190.5	0.163	4.50

R-Values are determined in accordance with ASTM C687 and C518. Complies with ASTM C764 as Type 1 pneumatic application.

COVERAGE CHART—CLOSED CAVITY RETROFIT (WALLS, FLOORS, CEILINGS) APPLICATION

The following thermal performances are achieved at the thicknesses, weights and coverages specified when insulation is installed with pneumatic equipment in sidewalls. Based on a design density of 1.6 pcf/25.6 Kg/m3.

R-VALUE To obtain a Thermal Resistance (R) of:	BAGS PER 1,000 SQ. FT. Bags per 1,000 sq. ft. of net area	MAXIMUM SQ. FT. PER BAG Contents of bag should not cover more than: (sq. ft.)	MINIMUM WEIGHT POUNDS PER SQ. FT. of installed insulation should not be less than: (lbs.)	MINIMUM THICKNESS Should not be less than: (in.)
29	31.2	32.1	0.967	7.25
22	23.6	42.3	0.733	5.50
16	17.2	58.2	0.533	4.00
15	16.1	62.0	0.500	3.75
14	15.1	66.4	0.467	3.50

READ THIS BEFORE YOU BUY

What you should know about R-Values:

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

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

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

It has been shown that light density loose fill insulations can sustain R-Value reductions at cold winter temperatures. Actually, any fiber/air insulation can sustain R-Value reduction at cold temperatures, but it has been demonstrated that batt products don't experience this phenomenon at temperatures that occur naturally in attics.

Cold temperature R-Value reduction is caused by convection—air movement resulting from light density warm air rising in denser cold air. If a large enough temperature gradient exists across an attic insulation, convection can occur. The temperature at which convection starts in an attic insulation depends on the insulation's thickness, density and fiber characteristics as well as on framing size and spacing.

Stated R-Values are measured in accordance with FTC regulations. Depending on installed density, thickness, attic framing and presence of batt insulation, R-Values may be reduced at cold temperatures due to convective air movement in the insulation. At winter design conditions, the cold temperature R-Value loss of InsulSafe® SP Insulation in Minneapolis, MN, for example, is 2% at R-49 (CertainTeed's recommended R-Value for Minnesota) and 0% at R-38. As another example, in Bemidji, MN, the R-Value loss of InsulSafe SP at winter design conditions is 18% at R-49 and 16% at R-38.

"Winter design conditions" refers to the temperature which has been equaled or exceeded 99% of the winter; by definition, temperatures colder than design conditions occur only 1% of the time in winter. Thus the average winter temperature is much warmer than the winter design temperature. For example, Minneapolis, with a winter design temperatures of -16°F, has an average winter temperature of +16°F.

To maintain label R-Values at winter design conditions in very cold regions, extra insulation can be installed in accordance with the chart to the right. At temperatures of -15°F to +75°F, label R-Values or higher are obtained by installing InsulSafe SP in accordance with the Thermal Performance-Horizontal Open Blow Chart.

Winter Design Temp. Degrees F	R-30		R-38		R-44		R-49		R-60	
	Extra Depth, Inches	Extra Bags Per 1000 Sq. Ft.	Extra Depth, Inches	Extra Bags Per 1000 Sq. Ft.	Extra Depth, Inches	Extra Bags Per 1000 Sq. Ft.	Extra Depth, Inches	Extra Bags Per 1000 Sq. Ft.	Extra Depth, Inches	Extra Bags Per 1000 Sq. Ft.
-16 to -19	0	0.0	0	0.0	0	0.0	1/2	0.9	1	1.9
-20 to -23	0	0.0	1/4	0.6	1	1.9	1 1/2	2.7	2	3.7
-24 to -28	0	0.0	1 3/4	2.7	2 1/4	4.0	2 3/4	4.9	3 1/4	5.8
-29 and colder	3/4	1.0	2 1/2	3.9	3 1/4	5.3	3 1/2	6.2	4	7.1

ASK ABOUT OUR OTHER CERTAINTEED PRODUCTS AND SYSTEMS:

EXTERIOR: ROOFING • SIDING • WINDOWS • FENCE • RAILING • TRIM • DECKING • FOUNDATIONS • PIPE
INTERIOR: INSULATION • WALLS • CEILINGS

CertainTeed Corporation
P.O. Box 860
Valley Forge, PA 19482

Professional: 800-233-8990
Consumer: 800-782-8777
www.certainteed.com



TECHNICAL BULLETIN

TECHNICAL BULLETIN

TECHNICAL BULLETIN

Certainteed Corporation - Insulation Group
P.O. Box 860
Valley Forge, PA 19482

TECHNICAL BULLETIN #53

DATE: January 7, 1993

SUBJECT: Loose Fill Insulation Convection

In Technical Bulletin #51, dated February 13, 1992, we provided an Energy Design Update article suggesting that, as we had already concluded, convection's seasonal impact, even in very cold climates, was small. Now, nearly two years since presenting their first "sensational" findings about loose fill convection, Oak Ridge National Laboratory has published data on the energy consumption increases associated with it. The attached Energy Design Update article translates this into dollars and, as we've said again and again, the numbers are small. The "penalty" for the worst case listed, Bismarck, ND, is \$17.58 per year with gas heat. Electric resistance heat figures are higher, but that type of heat in cold areas is not very sensible.

Remember that attic insulation in cold areas can easily save \$1000 per year, decreasing that order of savings by \$20 is certainly not a big deal to most homeowners.

The recent Oak Ridge report and EDU article should convince even the skeptics that convection in loose fill insulations is, indeed, Much Ado About Nothing.

If you're wondering whether the first (1991) Oak Ridge convection report could have put the issue into proper perspective and avoided many hassles over the past two years, the answer is yes. It was irresponsible not to do that.

Attachment

sional field use unless it is used with considerable caution and knowledge of its shortcomings. For example, it can be left on a table upon entering a dwelling and read after it has been in place for sufficient time for the temperature to stabilize. Users can experiment to see how long it takes to change.

One of the Airguide's advantages that was not emphasized in the *EDU* article should be mentioned. In many households, the temperature is set lower at night during the heating season to save energy. Unfortunately, at lower temperatures the relative humidity increases. The memory capability of the hygrometer can be used to see just how high the relative humidity

gets overnight. For optimal health of the occupants, the indoor relative humidity should remain between about 30% and 55%. If the relative humidity is found to be higher than 55% or so, then the homeowner should consider measures to reduce moisture sources, increase ventilation, or utilize dehumidification.

I hope these comments help your readers use the "Best" hygrometer properly.

Sincerely,

George Tsongas
Professor, Portland State University
Portland, Oregon

RESEARCH AND IDEAS

Fiberglass Convection Problem — Much Ado About Nothing?

Oak Ridge National Laboratory has published its long-awaited analysis of annual performance of low-density loose-fill fiberglass attic insulation in cold climates. The results conclusively show that despite considerable loss of R-value at very cold temperatures due to air convection, the overall annual performance of the low-density products is not significantly different from high-density loose-fill or batt insulations, which do not suffer from convection. For average gas-heated homes, the total impact on annual fuel bills should be less than \$20 in cold climates and zero in climates with less than 3,000 heating degree days.

Using measured R-value data obtained in the Oak Ridge Large Scale Climatic Simulator (LSCS), researcher Ken Wilkes ran a computer simulation using hour-by-hour weather data for 26 US cities. Table 1, which is derived from Wilkes' data, shows the increase in heat loss and resultant increase in energy cost for a 1,500-square-foot house with R-38 loose-fill attic insulation in each of the 26 cities.

For those cities with less than 5,000 heating degree days, the annual fuel cost increase is less than \$3.00 per year with gas heat. Even in Bismarck, North Dakota, with over 9,000 degree days, the total penalty is less than \$20 with gas heat. For 9 cities, there was zero increase in total heat loss and energy consumption.

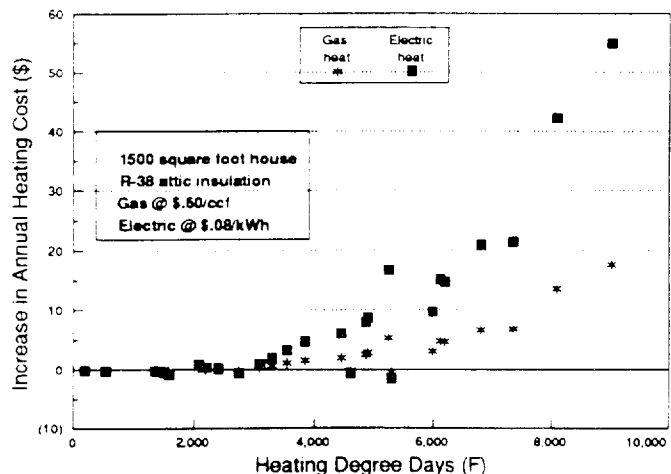


Figure 1 — Annual increase in fuel cost due to convection in low-density loose-fill fiberglass attic insulation versus heating degree days. Source: Oak Ridge National Laboratory.

Worst-case situation

These results are based on tests performed using Owens Corning Advanced Thermacube Plus insulation that was installed at relatively low density (0.5 pounds per cubic foot). With higher-density material, such as Owens Corning Standard Blend or Manville Rich-R, convection should have even less effect.

Small impact on peak design load

What about the impact of convection on peak design load and the possible implications for electric utilities? Here again, the total impact is relatively small. At 0°F, the increase in design heat loss due to convection for a 1,500-square-

Table 1 — Calculated annual increase in energy consumption due to convection in loose-fill fiberglass attic insulation. Values are for a 1,500-square-foot home with low-density R-38 loose-fill insulation.

City	Heating degree days (F)	Increase in total heat loss		Increase in total fuel cost	
		Million Btu	%	Gas*	Electric**
Bismarck, ND	9022	2.34	26.88	\$17.58	\$54.96
Minneapolis, MN	8095	1.80	23.45	\$13.53	\$42.30
Portland, ME	7353	0.91	12.68	\$6.83	\$21.34
Albany, NY	6805	0.89	13.59	\$6.69	\$20.92
Topeka, KS	5247	0.71	13.37	\$5.33	\$16.67
Denver, CO	6114	0.64	10.41	\$4.83	\$15.08
Chicago, IL	6195	0.62	10.48	\$4.68	\$14.63
Salt Lake City, UT	5989	0.42	7.03	\$3.12	\$9.74
St. Louis, MO	4899	0.37	7.58	\$2.80	\$8.75
Washington, DC	4866	0.34	6.90	\$2.54	\$7.95
Albuquerque, NM	4452	0.26	5.62	\$1.95	\$6.08
Knoxville, TN	3852	0.20	5.15	\$1.52	\$4.75
Raleigh, NC	3550	0.14	3.77	\$1.05	\$3.27
Memphis, TN	3300	0.08	2.50	\$0.63	\$1.97
Atlanta, GA	3099	0.04	1.26	\$0.30	\$0.95
Riverside, CA	2083	0.03	1.14	\$0.26	\$0.81
Waco, TX	2203	0.02	0.63	\$0.11	\$0.35
Las Vegas, NV	2415	0.01	0.27	\$0.06	\$0.18
Miami, FL	189	0.0	0.0	\$0.0	\$0.0
Houston, TX	1363	0.0	0.0	\$0.0	\$0.0
Orlando, FL	543	0.0	0.0	\$0.0	\$0.0
Phoenix, AZ	1391	0.0	0.0	\$0.0	\$0.0
Los Angeles, CA	1507	0.0	0.0	\$0.0	\$0.0
Sacramento, CA	2755	0.0	0.0	\$0.0	\$0.0
Portland, OR	4602	0.0	0.0	\$0.0	\$0.0
El Toro, CA	1590	0.0	0.0	\$0.0	\$0.0
Seattle, WA	5300	0.0	0.0	\$0.0	\$0.0

*Gas cost = \$.60 per ccf; delivery efficiency 80%
 ** Electric cost = \$.08/kWh, delivery efficiency 100%

foot house with R-38 attic insulation is less than 1,400 Btu/hr or 0.41 kw. Even at -30°F, which only occurs for a few hours per year in the coldest US climates, the total increase in design load is less than 2,000 Btu/hr.

For more information, contact Ken Wilkes, Oak Ridge National Laboratory, Box 2008, Building 4508, Oak Ridge, TN 37831-6092; (615) 574-

5931. Wilkes' paper is published in the proceedings of the *Thermal Performance of the Exterior Envelopes of Buildings V* conference, available from the American Society of Heating, Refrigerating, and Air-Conditioning Engineers, 1791 Tullie Circle NE, Atlanta, GA 30329; (404) 636-8400 or from Oak Ridge National Laboratory, Box 2008, Oak Ridge, TN 37830, Attention: Pat Love; (615) 574-4346. ♦



Labeling and Advertising of Home Insulation

Information from NAIMA

In this issue, we examine the Federal Trade Commission's Amended Trade Regulation Rules concerning labeling and advertising of home insulation.

The insulation industry—including manufacturers, wholesalers, distributors, retail dealers and insulation contractors—has obligations which it must meet both in distributing the Manufacturer's Fact Sheets and in its advertising.

As a service to NAIMA's members and their customers, this issue of Insulation Facts has been prepared to help wholesalers, distributors, retail dealers and insulation contractors be aware of and understand the FTC's reasoning for the Amended R-value Rule, which applies to home insulation materials produced and sold after Nov. 27, 2005.¹

The section of the Rule that applies to each group is given first in italics. Below each section are explanatory comments taken from the Federal Trade Commission.

FTC's Overview of the Rule

Insulation can be a very significant energy conservation measure. Its insulating capacity can be measured only by its R-value, which signifies the insulation's degree of resistance to the flow of heat. No other piece of information can tell the consumer how

the insulation is likely to perform as an insulator, and whether the cost of the insulation is justified. Yet the record demonstrates that the home insulation market has frequently failed to provide this crucial information to consumers.

In amending the Rule, the FTC confirmed that there remains a need for the R-value Rule to protect consumers against deceptive and misleading advertising claims: "the Commission issued the R-value Rule to prohibit, on an industry-wide basis, specific unfair or deceptive acts or practices."²

The primary purpose of the Rule, therefore, is to correct the failure of the home insulation marketplace to provide this essential pre-purchase information to the consumer. The information will give consumers an opportunity to compare relative insulating efficiencies, to select the product with the greatest efficiency and potential for energy savings, to make a cost-effective purchase and to consider the main variables limiting insulation effectiveness and realization of claimed energy savings.

The Rule mandates that specific R-value information for home insulation products be disclosed in certain ads and at the point of sale. The purpose of the R-value disclosure requirement for advertising is to prevent consumers from being misled by certain claims which have a bearing on insulating value. At the point of transaction, some consumers will be able to get the

requisite R-value information from the label on the insulation package. However, since the evidence shows that packages are often unavailable for inspection prior to purchase, no labeled information would be available to consumers in many instances. As a result, the Rule requires that a fact sheet be available to consumers for inspection before they make their purchase.

In general, the fact sheets and labels for each insulation product disclose the same basic kind of information about R-value. The fact sheet also gives consumers further information that has an important bearing on how they should assess their insulation needs and their likely fuel savings from insulation. The Commission believes that these additional disclosures are necessary to prevent deception and to allow consumers to make rational, well-informed choices in their insulation purchases.

The Rule also requires that R-value disclosures be accompanied by a brief explanation that R-value is a measure of insulating power; the higher the R-value, the greater the insulating power. Since the evidence shows that many consumers are unfamiliar with the concept, the Commission believes that an explanation of the term is needed to compensate for this market deficiency to ensure that consumers will benefit from the prescribed R-value information.

The other major provision of the Rule addresses energy savings and other promotional claims for home insulation products, including tax benefit and government certification claims. Claims that a product is certified or qualifies for a tax benefit are prohibited unless true. Since the amount of energy and money that can be saved by insulation is affected by a number of factors

unrelated to the performance of the insulation itself, the Rule provides that energy savings must be substantiated and accompanied by a short disclaimer that savings will depend on the consumers' particular circumstances.

The amended Rule automatically covers new types or forms of insulation marketed for use in the residential market, whether or not the Rule specifically refers to them: "The requirements of the R-value Rule apply to any material (unless specifically exempted) 'mainly used to slow down heat flow.'³ The fact that the Rule does not specifically mention a particular type of insulation does not exempt such products from the Rule coverage."⁴

1 Parties Covered

The Rule applies to home insulation manufacturers, professional installers, retailers who sell insulation to consumers for do-it-yourself installation, and new home sellers (including sellers of manufactured housing.) The Rule also applies to distributors, franchisers, utility companies, trade associations, and advertisers and advertising agencies. It also applies to testing laboratories that conduct R-value tests for home insulation manufacturers or other sellers who use the test results as the basis for making R-value claims about home insulation products.⁵

2 The Retailer

Rule 460.14 How retailers must handle fact sheets

If you sell insulation to do-it-yourself customers, you must

have fact sheets for the insulation products you sell. You must make the fact sheets available to your customers. You can decide how to do this, as long as your insulation customers are likely to notice them. For example, you can put them in a display and let customers take copies of them. You can keep them in a binder at a counter or service desk and have a sign telling customers where the fact sheets are.

You need not make the fact sheets available to customers if you display insulation packages on the sales floor where your insulation customers are likely to notice them and each individual insulation package offered for sale contains all package label and fact sheet disclosures required by §460.12 and §460.13.

Where do you get fact sheets?

Fact sheets are available either directly from the insulation manufacturer or from your distributor or wholesaler.

FTC's Explanatory Comments

In the years since the Commission created the R-value Rule, the nature of retail sales to do-it-yourself consumers has changed. Retailers who sell insulation to do-it-yourself consumers were required to make the manufacturers' Fact Sheets available to consumers because insulation packages were so bulky they were not normally available on the retail sales floor, so the consumer would not see the disclosures on the package labels before purchase. Today, retailers typically sell home insulation directly from warehouse-type sales floors where consumers select the packages themselves. Therefore, the Commission has amended the Rule to give individual retailers an

option not to make fact sheets available to consumers if the retailer determines the package labels contain the information that would otherwise be in the fact sheets and the packages are displayed in a way that customers can obtain the required information prior to purchase. This amendment does not change the manufacturers' responsibility to prepare and disseminate fact sheets.⁶

3 The Installer

Rule 460.15 How installers must handle fact sheets

If you are an installer, you must have fact sheets for the insulation products you sell. Before customers agree to buy insulation from you, you must show them the fact sheet(s) for the type(s) of insulation they want. You can decide how to do this. For example, you can give each customer a copy of the fact sheet(s). Or, you can keep the fact sheets in a binder, and show customers the binder before they agree to buy.

Where do you get fact sheets?

Fact sheets are available either directly from the insulation manufacturer or from your distributor or wholesaler.

FTC's Explanatory Comments

The thrust of this requirement is simply that consumers must be given an opportunity to analyze the fact sheet information before they commit themselves to a purchase.

Rule 460.17 What installers must tell their customers

If you are an installer, you must give your customers a con-

tract or receipt for the insulation you install. For all insulation except loose-fill and aluminum foil, the receipt must show the coverage area, thickness and R-value of the insulation you installed. For loose-fill, the receipt must show the coverage area, initial installed thickness, minimum settled thickness, R-value, and the number of bags used. For aluminum foil, the receipt must show the number and thickness of the air spaces, the direction of heat flow and the R-value. The receipt must be dated and signed by the installer. To figure out the R-value of the insulation, use the data that the manufacturer gives you. Do not multiply the R-value for one inch by the number of inches you installed. If you put insulation in more than one part of the house, put the data for each part on the receipt. You can do this on one receipt, as long as you do not add up the coverage areas or R-values for different parts of the house.

FTC's Explanatory Comments

The receipt will inform customers of what was actually installed.

Unlike do-it-yourself consumers, these purchasers will never actually see a label stating the R-value, thickness and coverage achieved. Consumers who buy insulation through installers are, thus, in the same position as new home buyers. Without a requirement to disclose exactly what was installed, they cannot fully assess the energy efficiency of their houses. Disclosure of this information will provide them with an available reference if they consider the purchase of additional insulation in the future.

The information required to be conveyed by installers to

their customers will help contractors to install appropriate amounts even if inconsistencies arise between the initial and settled thickness information. This other information (e.g. bag count) also provides installers, consumers, and inspectors an additional means to verify that the appropriate amount of material has been installed. It may also discourage unscrupulous installers from intentionally altering the blowing machine settings to "fluff" material (i.e. increase thickness at the expense of density and total R-value). Although initial installed thickness will provide important guidance to installers, they still will have to pay attention to area measurements and bag counts to ensure they install the correct thickness and amount.⁷

4 The New Home Seller

Rule 460.16 What new home sellers must tell new home buyers

If you are a new home seller, you must put the following information in every sales contract: the type, thickness and R-value of the insulation that will be installed in each part of the house. There is an exception to this rule. If the buyer signs a sales contract before you know what type of insulation will be put in the house, or if there is a change in the contract, you can give the buyer a receipt stating this information as soon as you find out.

FTC's Explanatory Comments

"New homes" means new houses, condominiums, cooperatives, mobile homes, vacation dwellings or other residential

housing units. Existing residential structures, which have been or will be retrofitted in preparation for resale, are considered “new houses” when they are sold by someone engaged in the business of the sale of housing units.

New home sellers do not have to display either insulation labels or fact sheets. The critical information needed by new home buyers is the type, thickness and R-value. Such a provision will ensure that the new home buyer is informed of these facts prior to the purchase decision. If no insulation is installed or to be installed, the facts should be disclosed.

Evidence demonstrates that many new home buyers are as interested in energy efficiency as retrofit purchases of insulation. Since a new home has no history of utility bills, however, the buyer is unable to evaluate the house’s anticipated energy consumption pattern. In hearings, the Council of Better Business Bureaus pointed out that requiring this disclosure to new home buyers will encourage the installation of adequate insulation in homes.

About the exception to the rule: Suppose the buyer’s contract stipulates an insulation that is not available at the time the builder is ready to purchase and another type must be substituted? The house seller would simply be required to provide the buyer with another fact sheet for the type of insulation that is actually installed. The buyer then is at least informed of relevant information about the insulation that will be installed, although it may be too late to bargain about the subject.

5 Retail, Contractor and New Home Seller Insulation Ads

Rule 460.18 Insulation ads

(a) If your ad gives an R-value, you must give the type of insulation and the thickness needed to get that R-value. Also, add this statement explaining R-values: “The higher the R-value, the greater the insulating power.” Ask your seller for the fact sheet on R-values.

(b) If your ad gives a price, you must give the type of insulation, the R-value at a specific thickness, the statement explaining R-values in subsection (a) and the coverage area for that thickness. If you give the price per square foot, you do not have to give the coverage area.

(c) If your ad gives the thickness of your insulation, you must give its R-value at that thickness and the statement explaining R-values in subsection (a).

(d) If your ad compares one type of insulation to another, the comparison must be based on the same coverage areas. You must give the R-value at a specific thickness for each insulation and the statement explaining R-values in subsection (a). If you give the price of each insulation, you must also give the coverage area for the price and thickness shown. However, if you give the price per square foot, you do not have to give the coverage area.

(e) The affirmative disclosure requirements in §460.18 do not apply to ads on television or radio.

FTC’s Explanatory Comments

Rule 460.18 applies only to ads and other promotional materials directed solely to consumers, and which promote a specific insulation product.

In new home seller ads, the FTC allows advertisers to delete

references to fact sheets found in 460.18 (a) and 460.19 (b).

Evidence concerning R-value disclosures indicates that there are several circumstances under which advertising disclosures are necessary. First, the evidence shows that thickness and R-value must always go hand-in-hand. A thickness disclosure is necessary before consumers can evaluate products with the same R-value, since different materials provide the same R-value at different thicknesses.

References to either of these product attributes, thickness or R-value, without mentioning the other, are unfair and deceptive to consumers.

Price claims standing alone are both unfair and deceptive. A very high R-value can be achieved at a very low price if, for that price, only a small area will be insulated. The Commission’s Rule requires that price claims be accompanied by the R-value, thickness and coverage area at that price.

The requirement that comparisons be based on equal coverage areas is necessary to prevent unfair and deceptive comparisons.

6 Savings Claims

Rule 460.19 Savings claims

(a) If you say or imply in your ads, labels or other promotional materials, that insulation can cut fuel bills or fuel use, you must have a reasonable basis for the claim. For example, if you say that insulation can “slash” or “lower” fuel bills, or that insulation “saves money,” you must have a reasonable basis for the claim. Also, if you say that insulation can “cut fuel use in half” or “lower fuel bills

by 30 percent,” you must have a reasonable basis for the claim.

(b) If you say or imply in your ads, labels or other promotional materials that insulation can cut fuel bills or fuel use, you must make this statement about savings: “Savings vary. Find out why in the seller’s fact sheet on R-values. Higher R-values mean greater insulating power.”

(c) If you say or imply that a combination of products can cut fuel bills or use, you must have a reasonable basis for the claim. You must make the statement about savings in subsection (b). Also, you must list the combination of products used. They may be two or more types of insulation; one or more types of insulation plus one or more other insulating products, like storm windows or siding; or insulation for two or more parts of the house, like the attic and walls. You must say how much of the savings came from each product or location. If you cannot give exact or approximate figures, you must give a ranking. For instance, if your ad says that insulation and storm doors combined cut fuel use by 50 percent, you must say which one saved more.

(d) If your ad or other promotional material is covered by section 460.18 (a), (b), (c) or (d), and also makes a savings claim, you must follow the rules in 460.19. However, you need not make the statement explaining R-value in 460.18 (a).

(e) Manufacturers are liable if they do not have a reasonable basis for their savings claims before the claim is made. If you are not a manufacturer, you are liable only if you know or should know that the manufacturer does not have a reasonable basis for the claim.

(f) Keep records of all data on savings claims for at least three years. For the records showing proof for claims, the three years will begin again each time you make the claim. Federal Trade Commission staff members can check these records at any time, but they must give you reasonable notice first.

(g) The affirmative disclosure requirements in §460.19 do not apply to ads on television or radio.

FTC’s Explanatory Comments

The “savings claim” provision is based on the conclusion that, to remedy the deception inherent in savings claims, consumers must be told that savings depend upon many factors and what those factors are. The Rule simply requires a brief statement that savings vary and a reference to the fact sheets for further information. A detailed enumeration of the factors that affect fuel savings is required in the fact sheets, where space limitations are not so serious a problem.

The Rule also requires the industry members to have a reasonable basis for savings claims. It is not possible to specify in the Rule precisely what would be an acceptable basis for such claims. Scientifically reliable measurements of fuel used in actual homes, or reliable computer models or methods of heat flow calculation, would meet the reasonable basis requirement imposed by the Rule. The language used in a savings claim will influence the level of substantiation required. An advertiser who claims that adding insulation will “slash fuel bills” or “cut fuel use in half” will be required to produce competent and reliable scientific proof that such high levels of savings will be achieved.

The record also indicates that some industry members claim that a combination of products, such as attic insulation and storm doors, will combine to reduce fuel use. It is not always possible to determine precisely how much of the savings is attributable to each product. As a result, the Rule requires that savings claims for more than one product disclose the combination of products used and how much of the savings come from each product. If the exact or approximate contributions of the product cannot be ascertained under available technologies, the advertiser may rank the products in order of their relative degrees of contribution. This disclosure, while imperfect, will at least apprise customers of the fact that not all of the products in the combination contributed equally to the savings achieved.

7 R-Value Per Inch Claims

Rule 460.20 R-value per inch claims

In labels, fact sheets, ads, or other promotional materials, do not give the R-value for one inch or the “R-value per inch” of your product. There are two exceptions: (1) You can do this if you suggest using your product at a one-inch thickness; (2) You can do this if actual test results prove that the R-value per inch of your product does not drop as it gets thicker.

You can list a range of R-values per inch. If you do, you must say exactly how much the R-value drops with greater thickness. You must also add this statement: “The R-value per inch of this insulation varies with thickness. The

thicker the insulation, the lower the R-value per inch.”

FTC’s Explanatory Comments

Since the record demonstrates that R-values are not linear, ads, labels and other promotional materials that express a product’s thermal resistance in terms of its R-value per inch deceive customers.

The Commission believes that references to the R-value for a one-inch thickness of the material will encourage consumers to think that it is appropriate to multiply this figure by the desired number of inches, as though the R-value per inch were constant.

8 Certification Claims

Rule 460.21 Government claims

Do not say or imply that a government agency uses, certifies, recommends or otherwise favors your product unless it is true. Do not say or imply that your insulation complies with a governmental standard or specification unless it is true.

FTC’s Explanatory Comments

Ads on the record reveal that manufacturers sometimes deceptively associate their products with federal agencies. While an insulation material may meet federal procurement standards, no product is certified or recommended by the government for private use.

9 Tax Claims

Rule 460.22 Tax claims

Do not say or imply that your product qualifies for a tax benefit unless it is true.

10 Enforcement

Any regulation is subject to interpretation. This is NAIMA’s interpretation of these critical issues. You should work with your own attorney to advise you of your responsibility under this rule.

Breaking any of these rules could be interpreted as an unfair and deceptive act or an unfair method of competition. The regulations provide for a possible fine of up to \$11,000 each time a rule is broken.⁸

11 Final Note

In the preamble to the amended R-value Rule, the FTC stated that “[h]ome insulation sellers should be aware that additional Commission rules or guidelines may also apply to them.” The FTC offered as examples that “Commission’s Guides for the Use of Environmental Marketing Claims,” the “Commission’s rules Concerning Disclosures of Written Consumer Product Warranty Terms and Conditions and the Pre-Sale Availability of Written Warranty Terms,” and section 5 of the FTC Act prohibiting unfair and deceptive ads or practices requiring that advertisers and other sellers have a reasonable basis for advertising and other promotional claims before they are disseminated.⁹

References

1. 70 Fed. Reg. at 31, 257 (May 31, 2005).
2. *Ibid* at 31, 259.

3. *Ibid* at 31, 258.
4. *Ibid*.
5. 16 CFR § 460.3
6. 70 Fed. Reg. at 31, 271.
7. 70 Fed. Reg. at 31,267.
8. 16 CFR § 460.1
9. 70 Fed. Reg. at 31, 258

About NAIMA

NAIMA is the association of North American manufacturers of fiber glass, rock wool, and slag wool insulation products. NAIMA’s role is to promote energy efficiency and environmental preservation through the use of fiber glass, rock wool, and slag wool insulation products and to encourage safe production and use of these insulation products.

For additional information on building insulation contact:

NAIMA
44 Canal Center Plaza, Suite 310
Alexandria, VA 22314
Tel: 703/684-0084
Fax: 703/684-0427
www.naima.org

NAIMA MEMBERS:

- CertainTeed Corp.
Valley Forge, PA
- Evanite Fiber Corp.
Corvallis, OR
- Fibrex Insulations, Inc.
Sarnia, Ontario
- Guardian Building Products
Albion, MI
- Isolatek International
Stanhope, NJ
- Johns Manville
Denver, CO
- Knauf Insulation
Shelbyville, IN
- Industrial Insulation Group, LLC
Brunswick, GA
- Owens Corning
Toledo, OH
- Rock Wool Manufacturing Co.
Leeds, AL
- Rolan Aislantes Minerales, S.A. de C.V.
D.F., México
- Roxul, Inc.
Milton, Ontario
- Sloss Industries Corp.
Birmingham, AL
- Thermafiber, Inc.
Wabash, IN
- USG Interiors, Inc.
Chicago, IL

Frequently Asked Questions About Insulation

Information from NAIMA

FAQs ABOUT FIBER GLASS INSULATION

What are the major uses of fiber glass insulation?

Fiber glass serves a number of useful purposes, but the most important application of wool-type fiber glass is as insulation used primarily to control temperature and sound in homes, commercial buildings and industrial operations. Wool-type fibers are also used to manufacture a variety of sound-control products and insulation for air ducts, pipes, roofs, walls, floors, automobiles, mobile homes, aircraft, refrigerators, domestic cooking appliances, as well as other appliances and equipment. For additional information, visit the NAIMA web site.

What are the benefits of fiber glass insulation?

Fiber glass insulation is a cost-effective, energy-saving product that saves money for individuals and businesses through lower utility bills while increasing the comfort levels for all building occupants.* In addition, adequate levels of fiber glass pipe insulation for industrial processes have helped make

industry more efficient and more profitable by cutting energy losses and decreasing production costs. By avoiding the added energy generation necessary to heat and cool buildings, fiber glass insulation continues to be a benefit to the environment by helping to reduce pollution emissions.

Fiber glass insulation products play a significant energy-savings role by reducing energy use in homes, office buildings, businesses and manufacturing plants. In 1996, a study was conducted jointly by the Alliance to Save Energy and Energy Conservation Management, Inc. regarding the energy and environmental benefits of insulation. The report, entitled "Green and Competitive," found that insulation currently in place in residential buildings throughout the United States saves 10.41 quadrillion Btu's each year. That is enough energy to generate 36% of America's annual electric consumption or the equivalent of a 255-day supply of gasoline for the entire United States.

While the energy savings from fiber glass insulation are significant, so are the environmental benefits. By making



www.naima.org

* Savings vary. Higher R-value means greater insulating value.

buildings more energy efficient, fiber glass insulation helps reduce the amount of fossil fuel combustion needed to heat and cool homes, businesses, and factories. That, in turn, decreases the amount of carbon dioxide emitted into the atmosphere.

Because carbon dioxide is one of the principal “greenhouse gases” contributing to global warming, insulation plays a significant role in protecting the environment. For example, according to the “Green and Competitive” report, insulation currently in place in residential buildings reduces the amount of carbon dioxide emissions into the atmosphere by 1.35 trillion pounds each year. Almost 300 million acres of trees would have to be planted to remove this much carbon dioxide naturally from the atmosphere.

How does fiber glass insulation compare with other insulation materials?

Thermal Performance – Installed R-value

When insulating a home, it is important to get the R-value specified by the local energy code or the Department of Energy recommendations. It’s also important that the product provide long-lasting thermal performance. For more information on insulation recommendations for a specific area, contact the local building department or the local gas or electric utility for their recommendations.

While R-value “per inch” is promoted by some manufacturers, the overall R-value installed is what counts. Fiber glass insulation products come in R-values ranging from R-11 to

R-38 for fiber glass batts and rolls.

Fiber glass insulation can be blown in an attic to nearly any R-value. More R-value alternatives provide greater flexibility in meeting code energy requirements in your area.

Lifetime Performance

In order to ensure the expected energy savings, it is important that the insulation does not deteriorate, or settle, over time. Fiber glass batts and rolls do not settle. Fiber glass loose-fill insulations may settle slightly (1-3%) resulting in virtually no impact on the thermal performance of the insulation.

In contrast, cellulose insulation not only settles to a much greater degree (approximately 20%), but also at a higher rate. If cellulose insulation is being considered, make sure the installer understands that most cellulose insulations settle in attic loose-fill applications – that’s a significant loss of insulating effectiveness. In fact, the Insulation Contractors Association of America recommends that an additional 25% of thickness be added for cellulose insulation to compensate for this extreme loss of R-value.

Fire Safety

Fiber glass and cellulose perform very differently in terms of fire safety. Fiber glass insulation is naturally non-combustible because it is made from sand and recycled glass. The insulation requires no additional fire-retardant chemical treatments.

Most facings attached to fiber glass insulation are combustible and should never be left exposed. Other special flame-resistant facings may be

left exposed where desired, such as on a basement or crawl space wall.

Cellulose insulation is made primarily of ground-up or shredded newspaper, which is naturally combustible. To protect against fire, cellulose insulation is heavily treated with fire retardant chemicals. Though cellulose is treated with fire retardants, it is not fire proof. This means the insulation could still burn if exposed to a heat source. Also some tests have shown that fire retardant chemicals can lose their effectiveness over time.

Tests conducted by the California Bureau of Home Furnishings and Thermal Insulation demonstrated that most cellulose samples failed the standard fire safety test only six months after installation. Smoldering and re-ignition problems present additional concerns with cellulose insulation should a fire start.

Moisture

Insulation will lose its insulating efficiency or R-value when wet. Fiber glass insulation is not absorbent and, if exposed to moisture, will not wick up or hold water. It will dry out and retain its original R-value.

Because cellulose is made from shredded newspaper, it will absorb and hold moisture, reducing energy savings. If soaked, cellulose will mat down and the thermal performance can be permanently reduced.

Some cellulose insulations are actually applied with water added by what is called a wet-spray method. Wet-spray applications do not achieve their R-value until dry. A study conducted by the NAHB Research Center in 1997, found that cellulose insulation had installed

moisture content greater than 40%. According to the study, under summer conditions, the walls dried rapidly to below 30% in the first day, but under fall and spring conditions, the walls dried much slower and were still above 30% when the dry-wall was installed.

Waiting until the cellulose is dry to cover up is difficult with today's building construction schedules. If wet-spray applications are covered up too soon, moisture problems will occur. Not only does the insulation efficiency suffer, but moisture can affect other building components, such as wood studs, drywall and metal building components which can suffer corrosion from moisture and salts. Moisture can also lead to a number of additional indoor air quality problems by promoting mold and mildew growth.

Air Infiltration

Thermal insulation, whether fiber glass or cellulose, when installed in side walls has very little to do with air infiltration. The U.S. Department of Energy estimates that up to 40% of a home's heat loss can be from air infiltration. But only 14% of the total loss from air infiltration occurs through side wall cavities, and most of that is around electrical outlets, a problem easily solved with inexpensive, easy-to-install electrical insulated outlet gaskets.

Air infiltration generally occurs in the areas of a home that are not insulated, such as around windows, doors, fireplaces, HVAC ductwork and perimeter joints. It can, and should, be controlled with the use of housewrap, proper caulking, and sealing of band joists, sill plates, header plates, and insulation around

doors, windows, electrical outlets and other openings.

Recently there have been claims that some insulation products are better because they reduce air infiltration. Numerous research studies have been conducted to investigate this issue, among them studies by the National Association of Home Builders Research Center, researchers at Penn State University, and by a St. Louis utility. The research consistently demonstrated that if a wall cavity has been properly constructed, using drywall, sheathing and caulking, very little air will flow through the wall cavity regardless of the type of insulation.

Environmental Benefits

As the environmental consciousness of Americans has been heightened, the building industry has responded. This kind of rethinking has led to a strong push to use building materials with lower environmental impact.

Fiber glass insulation manufacturers have responded to this call for conservation by using increasing amounts of recycled materials in their products. As an industry, fiber glass insulation manufacturers recycle more material by weight (glass cullet – up to 40%) than any other type of insulation used in the building and construction sector.

The environmental benefits of fiber glass insulation, however, go far beyond its recycled content when analyzed from a life-cycle perspective. A life-cycle analysis is an appraisal of the environmental impacts connected with a product through an examination of the product's environmental traits during many stages including pre-manufac-

turing; manufacturing; distribution/packaging; use, reuse, maintenance; and waste management. In reviewing each of these stages, a life-cycle evaluation of fiber glass clearly shows its environmentally beneficial attributes. As an example, consider fiber glass versus cellulose insulation.

Cellulose manufacturers claim environmental benefits, even though they may be removing newsprint from an existing recycling loop. More trees must be cut and more energy used to make new newsprint and cardboard to make up for what has been used for cellulose insulation. And when it comes to insulating the same size home, pound for pound, it takes up to three times more cellulose than fiber glass to achieve the same insulating efficiency. Both insulations use the same amount of virgin material but the virgin material in fiber glass is sand – which is classified by the U.S. Environmental Protection Agency as a “rapidly renewable resource.”

NAIMA has developed a brochure outlining the various life-cycle characteristics that specifiers should consider in determining the most relevant attributes of an environmentally preferable insulation product: “Using Recycled Material Is Just the First Step...(N016)”

For additional information, see the following NAIMA publications:

- Union Electric Field Test Pits Cellulose Against Fiberglass... and the Winner Is... (RP029)
- Insulation Facts #14 Wet-Spray Cellulose Insulation Systems (BI460)

- Insulation Facts #30: Insulation and Fire Safety (BI472)
- Facts #54: Fire & Thermal Performance of Reflective Insulations in Metal Building Applications (MB313)
- Attic Insulation Performance: Full Scale Tests of Conventional Insulation and Radiant Barriers (Executive Summary) (RP051)

What types of fiber glass insulation are available?

There are two types of fiber glass insulation: fiber glass loose-fill (blown in) insulation, and fiber glass blanket insulation. Fiber glass loose-fill insulation comes in bags. Fiber glass blanket insulation comes in batts and rolls in various densities, widths and lengths to fit particular home insulation applications.

What is the function of the 'facing' on insulation?

The facing material is generally a vapor retarder and is usually applied toward the "warm-in-winter" portion of the home to help resist the movement of moisture vapor to cold surfaces where it can condense. This means that in the ceilings the vapor retarder faces down; in the walls, it faces the inside; and in the floors over unheated spaces, it faces up. In hot, humid climates, a vapor retarder may not be needed. Check local building practices or building codes in your area.

Is fiber glass insulation safe to use?

Yes. Fiber glass may cause itchiness and temporary skin irritation in many people handling the products. With

respect to more serious effects, fiber glass insulation is one of the most thoroughly tested building materials in use today. Nearly 70 years of extensive research and comprehensive reviews by independent research organizations have concluded that there is no convincing evidence that exposure to fiber glass is associated with respiratory disease or cancer in people. Other insulation materials do not enjoy the same long history of testing as fiber glass insulation.

Cellulose, for example, remains a largely untested commodity. Even though it is composed of approximately 20% chemicals by weight, the cellulose industry has performed little, if any, health and safety testing on its products. Questions about the health and safety aspects of cellulose insulation persist in the building industry. The limited scientific testing conducted on cellulose to date provides no assurance as to the safety of the material, particularly given its high exposure levels. For example, documented worker exposures to respirable cellulose fibers have been measured at 50 to 200 times higher than fiber glass. Clearly, more research is needed. For a complete review of the health and safety information on fiber glass, visit the NAIMA web site.

Is it safe to live in a home insulated with fiber glass?

Yes.

Do glass fibers contribute to problems with indoor air quality?

Fiber glass insulation products have a positive impact on the indoor envi-

ronment by: controlling heat loss or gain; reducing condensation which can lead to air pollutants; and by providing sound control. In 1990, the World Health Organization Working Group on Indoor Air Quality reviewed all previous scientific studies and concluded: "Current airborne man-made mineral fiber concentrations in indoor environments are considered to represent an insignificant risk." More than 20 other studies conducted at noted universities and laboratories, examining concentrations of fiber glass and other synthetic vitreous fibers (SVFs) – in residential and commercial buildings, consistently found that SVFs from insulation products in residential and commercial buildings do not significantly contribute to indoor air pollution, and would not be expected to adversely impact the health and/or well-being of occupants of such buildings.

What does the research show about the health and safety of fiber glass?

Fiber glass is one of the most thoroughly tested building products in the world with health and safety research on fiber glass spanning nearly 70 years. This research has been designed to investigate the possible human health effects of fiber glass and other SVFs. Recently, the International Agency for Research on Cancer removed fiber glass from its list of substances believed to be possibly carcinogenic to humans, based on the last 15 years of research.

Still, misinformation about the safety of fiber glass persists. Four areas of research have been especially important in helping to further

the understanding about the safety of these products. They include exposure assessments of current production workers and end-users; analyses of the rates and causes of death among former production employees; animal inhalation studies; and studies on the biosolubility of glass fibers.

In the exposure studies, airborne levels of respirable glass fibers have been demonstrated to be very low, with occupational exposures less than 1 fiber per cubic centimeter (1f/cc) in most instances, and consumer exposures much lower still.

Studies of more than 40,000 workers over a 40-year time frame have shown no dose-related or causal association between lung cancer or non-malignant respiratory disease and occupational exposure to fiber glass.

Numerous animal inhalation studies using massive doses of insulation glass wool fibers, hundreds to thousands of times greater than human exposures, have not shown a relationship between inhalation of glass fibers and cancer or respiratory disease. In one recent inhalation study, where hamsters were exposed to a very high dose of a special application glass fibers, the hamsters developed lung-scarring (fibrosis) and a single hamster showed a cancer of the lining of the lung (mesothelioma). This result is in contrast with six previous inhalation studies with the same fiber in which no fibrosis or disease resulted.

In research on the biosolubility of glass fibers, studies have shown that building insulation glass fibers generally dissolve in the lung in approximately the same time it takes for

clearance of the nuisance dust people breathe every day.

In summary, the safety of fiber glass insulation is supported by 70 years of research, which shows that exposures are low during manufacture, installation, use and removal; manufacturing workers are healthy; and, if inhaled, insulation fibers are quickly removed from the body.

For more details on recent scientific studies on the health aspects of fiber glass insulation, visit the NAIMA web site.

Does fiber glass cause cancer in people?

No. The International Agency for Cancer Research recently removed fiber glass from its list of possible carcinogens, based on its review of more than 15 years of research. Research conducted over the past 70 years shows that exposure levels are low, and that, even if inhaled into the lung, most fibers disappear quickly with no adverse health effects.

Is fiber glass like asbestos?

Fiber glass is fundamentally different from asbestos, both in its physical and chemical properties. Fiber glass is a man-made material. In contrast, asbestos is a naturally occurring, inorganic fiber. Our bodies can remove most types of fiber glass through a variety of mechanisms (it dissolves in the lungs, for example), while asbestos is more durable and stays in the body a lifetime. The American Conference of Governmental Industrial Hygienists (ACGIH), representing over 1,600 academic and government officials engaged in occupational safety and health programs, estimates that MMVFs are hun-

dreds of times less durable in the body than asbestos.

If fiber glass is safe, why are there health warnings on package labels?

Manufacturers have voluntarily provided warning labels on fiber glass products for years, even before they were required. Our industry strongly believes in full disclosure of all information related to our products and labels are one of the ways of providing information to workers and the public.

Labels are also required by the Occupational Safety and Health Administration (OSHA) as part of its Hazard Communications Standard. Fiber glass industry labels are in full compliance with these regulatory requirements. Many commonly used products including paint, cleaners, and artificial sweeteners also carry warning labels. The primary purpose of the labels is to offer appropriate health and safety warnings and to provide instructions on the safe use of the product.

Are there safer alternatives to fiber glass?

While fiber glass manufacturers have responsibly tested their products for health and safety, the same cannot be said of all other insulation products. Cellulose insulation, for example, is made from shredded newspaper that is naturally flammable and must be treated with toxic, fire-retarding chemicals like boric acid. Fiber glass, made from sand and recycled glass, is naturally nonflammable.

The public should also be concerned about the unknown risks associated with high exposures to cellu-

lose installation. Despite repeated requests by scientists, unions and contractor groups for basic health effects testing of cellulose insulation, cellulose manufacturers have conducted no published study on the health effects of cellulose insulation. In fact, the cellulose insulation industry markets its products as “safe” and as an “environmentally friendly” alternative to fiber glass, despite a lack of testing. Yet, several studies by independent scientists have identified the potential for significant health effects from exposure to cellulose fibers, including lung fibrosis and other respiratory effects. And in 1997, prompted by the lack of health testing by cellulose manufacturers, the Environmental Defense Fund placed cellulose on its list of 100 compounds that should be tested.

Are there any special handling guidelines for working with fiber glass?

Fiber glass, by its very nature, can cause itching during handling, a temporary, “mechanical” irritation that can result when fibers come in contact with the skin. If sufficient amounts of glass fibers are released into the air, some workers may experience temporary upper respiratory irritation. Like skin irritation, upper respiratory irritation is a “mechanical” reaction to the fibers. The irritation will subside after exposure is discontinued. Some people are more sensitive, some less, some not at all.

Fiber glass manufacturers have put together work practices that provide practical safety measures designed to minimize any potential irritation.

In all cases, however, manufacturers’ safe handling recommendations as outlined in their Material

Safety Data Sheets (MSDSs) should be consulted.

For additional information, see the following NAIMA publications:

- Working Smart with Fiber Glass, Rock Wool and Slag Wool Product – Recommended Work Practices for the Installation of Synthetic Vitreous Fibers (SVF) (N027)
- Play it Smart, Play it Safe (N028)
- HSPP – A Voluntary Program Designed to Assure Greater Worker Protection (N030)
- Facts #62: Health and Safety Facts for Fiber Glass (N040)

Where Can I Go For More Information?

For more information on the health and safety of fiber glass and rock and slag wool insulations, visit NAIMA’s web site.

FAQS ABOUT MINERAL WOOL (ROCK AND SLAG WOOL) INSULATION

What are the major uses for rock and slag wool insulations?

The physical and chemical properties of mineral wool insulation, also known as rock and slag wool, are major factors in their utility. Because the fibers are non-combustible and have melting temperatures in excess of 1800–2000° F, they are used to prevent the spread of fire. As a primary constituent of ceiling tile and sprayed

fire proofing, rock and slag wool products supply fire protection, as well as sound control and attenuation.

The excellent thermal resistance of these wools is a major factor in their use as residential and commercial insulation, pipe and process insulation, insulation for ships, mobile homes, domestic cooking appliances, and a wide variety of other applications. In addition, the use of rock and slag wool as a horticultural growing medium has increased in recent years.

What are the benefits of rock and slag wool insulations?

Rock and slag wool insulation products play a significant energy-savings role by reducing energy use in homes, office buildings, businesses and manufacturing plants. Insulating to proper economically efficient levels helps our homes and businesses use substantially less energy. According to a 1996 report on the energy, environmental and economic benefits of fiber glass, rock wool and slag wool insulations, conducted jointly by the Alliance to Save Energy and Energy Conservation Management, insulation produced each year saves about 400 trillion Btu annually, or more than 12 times the energy used to manufacture insulation.

The report, entitled “Green and Competitive” found the insulation currently in place in residential buildings throughout the United States could help cut residential energy bills by 40 percent. The energy savings from insulation also help the environment. By reducing the energy needed to heat and cool

homes and commercial buildings, installed fiber glass and mineral wool insulation in U.S. buildings helps prevent the emission of over 1.56 trillion pounds of carbon dioxide annually. The report goes on to say that if all residential buildings were insulated up to the latest version of the International Model Energy Code (IMEC), another 1.9 quadrillion Btu of energy could be saved and another 249 billion pounds of carbon dioxide emissions avoided annually.

Are rock and slag wool insulation products safe to use?

As with any product capable of producing airborne dust, concerns regarding the health and safety effects of rock and slag wool are understandable. However, few materials have been studied as extensively as mineral wool. The weight of scientific research confirms that these materials are safe to manufacture, install and use when manufacturers' recommended work practices are followed.

Health and safety research on rock and slag wool has been ongoing for nearly 70 years. NAIMA member companies have invested tens of millions of dollars in research projects with leading independent laboratories and universities in the United States and abroad. This research has been designed to investigate the possible human health effects of rock and slag wool as well as other MMVFs.

For a complete review of the health and safety information on rock and slag wool, visit NAIMA's web site.

What does the research show about the health and safety of rock and slag wool?

The health aspects and safe use of mineral wools have been examined for nearly 70 years. NAIMA and its member companies have invested tens of millions of dollars in research projects – with leading independent laboratories and universities in the United States and abroad – to investigate the possible human health effects of rock and slag wool as well as other synthetic vitreous fibers (SVFs), such as fiber glass.

Industry studies, as well as studies by governments and others, have examined the following:

- Airborne levels of rock and slag wool fibers during their manufacture, installation and use;
- The health of more than 13,000 current and former workers engaged in the manufacture of rock and slag wool in the United States and Europe; and
- The effects of rock and slag wool on laboratory animals.

Findings from all types of studies have been consistent. Airborne levels of respirable rock and slag wool fibers have been demonstrated to be very low, less than one fiber per cubic centimeter of air (1 f/cc) in most instances. Studies among workers have demonstrated no consistent association between lung cancer or non-malignant respiratory disease and occupational exposure to rock and slag wool.

For more details on recent scientific studies on the health aspects of rock and slag wool insulation, visit the NAIMA web site.

Do rock or slag wools cause cancer in people?

Studies examining possible health effects and safe use of mineral wools have found no consistent association between exposure to rock and slag wool and respiratory disease or cancer in humans. The weight of the scientific evidence confirms that rock and slag wool are safe to manufacture, install and use when manufacturers' recommended work practices are followed.

Do rock and slag wool fibers contribute to problems with indoor air quality?

Rock and Slag wool fibers actually improve the indoor environment by controlling heat loss or gain while reducing condensation and also providing acoustical insulation. Once rock or slag wool products are installed, no significant fiber release occurs.

The majority of airborne fiber levels in buildings containing one or more rock and/or slag wool products are very low, generally less than 0.001 f/cc. In fact, in 1990 the World Health Organization's Working Group on Indoor Air Quality reviewed all scientific studies and concluded: "Current airborne man-made mineral fiber concentrations in indoor environments are considered to represent an insignificant risk."

Are there any special handling guidelines for working with rock and slag wool?

If sufficient amounts of rock and slag wool are released into the air during manufacture and handling, some workers may experience temporary upper respiratory irritation. Like skin

irritation, upper respiratory irritation is a "mechanical" irritation to the fibers. The irritation will subside once the exposure is discontinued. Some people are more sensitive, some less, some not at all.

Manufacturers of rock and slag wool products have recommended a number of safety measures designed to minimize any potential irritation. Rock and slag wool manufacturers have put together work practices that provide practical safety measures designed to minimize any potential irritation. In all cases, however, manufacturers' specific recommendations as outlined in their Materials Safety Data Sheets (MSDSs) should be consulted.

For additional information, see the following NAIMA publications:

- Working Smart with Fiber Glass, Rock Wool and Slag Wool Product – Recommended Work Practices for the Installation of Synthetic Vitreous Fibers (SVF) (N027)
- Play it Smart, Play it Safe (N028)
- HSPP – A Voluntary Program Designed to Assure Greater Worker Protection (N030)
- Facts #63: Health and Safety Facts for Rock and Slag Wool (N041)

Where Can I Go For More Information?

For more information on the health and safety of fiber glass and rock and slag wool insulations, visit NAIMA's web site.

FAQS ABOUT HOME INSULATION

What does insulation actually do for my home?

Fiber glass insulation keeps your home cool in the summer and warm in the winter, because insulation resists the flow of heat. Heat is a form of energy and always seeks a cooler area – flowing out of the home in the winter and into the home in the summer. By reducing heat flow, a properly insulated home uses less energy for heating and cooling.

In addition to being an energy saver, fiber glass insulation also acts as a sound absorber. When installed in walls and ceilings, it can reduce the transmission of sound from one room to another or from the outside. In today's noise-laden environments, more and more homeowners are soundproofing their homes.

A well-insulated home increases the overall comfort of the home and adds to its resale value. Whether your home is new or old, it pays to insulate.

What areas of my home should be insulated?

Insulation is not just for attics and outside walls. Insulation should also be installed in other areas of your home such as ceilings with unheated spaces, basement walls, floors above vented crawl spaces, cathedral ceilings, floors over unheated garages or porches, knee walls, and in between interior walls (especially bathrooms), ceilings or floors for extra sound control.

How do I know how much insulation I need for my home?

The amount of insulation in a home varies depending upon where you live. You can check with your utility company or state energy office. In addition, the U.S. Department of Energy (DOE) has put together thermal (or R-value) recommendations for homes. These recommended insulation levels are based on geographic zones. Visit SimplyInsulate.com to learn what zone your home is in and how much you should insulate.

What is R-value?

Insulation is identified and labeled by R-value. "R" stands for resistance to heat flow. The higher the R-value, the greater the insulating power.

Manufacturers of insulation products print the R-values of their products either on bags or on labels attached to plain bags. In most cases, R-values are also printed on the facings of batts and rolls. On unfaced insulation, the R-value is printed on the product or indicated by stripe coding.

Where do I find R-value information when I go to buy insulation?

Insulation is identified and labeled by R-value. "R" stands for resistance to heat flow. The higher the R-value, the greater the insulating power. Manufacturers of insulation products print R-values of their products either on the bags or on the labels. In most cases, R-values are also printed on the facings of fiber glass batts and rolls.

What are the options when choosing insulation?

There are a variety of insulations to choose from including fiber glass, mineral wool, cellulose, foam and cotton. The two most common types of insulation for residential applications are fiber glass and cellulose. There are several things to consider before making an insulation decision:

Thermal Performance – Installed R-value

When insulating a home, it is important to get the R-value specified by the builder or the local building code. It's also important that the product provide long-lasting thermal performance. For more information on insulation recommendations for a specific area, contact the local building department or the local gas or electric utility for their recommendation.

While R-value “per inch” is promoted by some manufacturers, the overall R-value installed is what counts. Fiber glass insulation products come in R-values ranging from R-11 to R-38 for fiber glass batts and rolls. Fiber glass insulation can be blown in an attic to nearly any R-value. More R-value alternatives provide greater flexibility in meeting code energy requirements in your area.

Lifetime Performance

In order to ensure the expected energy savings, it is important that the insulation does not deteriorate, or settle, over time. Fiber glass batts and rolls do not settle. Fiber glass loose-fill insulations may settle approximately 1-3% resulting in virtu-

ally no impact on the thermal performance of the insulation.

In contrast, cellulose insulation not only settles to a much greater degree (approximately 20%), but also at a higher rate. If cellulose insulation is being considered, make sure the installer understands that most cellulose insulations settle in attic loose-fill applications – that's a significant loss of insulating effectiveness. In fact, the Insulation Contractors Association of America recommends that an additional 25% of thickness be added for cellulose insulation to compensate for this extreme loss of R-value.

Fire Safety

Fiber glass and cellulose perform very differently in terms of fire safety. Fiber glass insulation is naturally non-combustible because it is made from sand and recycled glass. Fiber glass insulation requires no additional fire-retardant chemical treatments.

Most facings attached to fiber glass insulation are combustible and should never be left exposed. Other special flame-resistant facings may be left exposed where desired, such as on a basement or crawl space wall.

Cellulose insulation is made primarily of ground-up or shredded newspaper, which is naturally combustible. To protect against fire, cellulose insulation is heavily treated with fire retardant chemicals.

Though cellulose is treated with fire retardants, it is not fire proof. This means the insulation could still burn if exposed to a heat source. Also some tests have shown that fire retardant chemicals can lose their effectiveness over time.

Tests conducted by the California Bureau of Home Furnishings and Thermal Insulation demonstrated that most cellulose samples failed the standard fire safety test only six months after installation. Smoldering and re-ignition problems present additional concerns with cellulose insulation should a fire start.

Moisture

Insulation will lose its insulating efficiency or R-value when wet. Fiber glass insulation is not absorbent and, if exposed to moisture, will not wick up or hold water. It will dry out and retain its original R-value.

Because cellulose is made from shredded newspaper, it will absorb and hold moisture, reducing energy savings. If soaked, cellulose will mat down and the thermal performance can be permanently reduced.

Some cellulose insulations are actually applied with water added by what is called a wet-spray method. Wet-spray applications do not achieve their R-value until dry. A study conducted by the NAHB Research Center in 1997, found that cellulose insulation had installed moisture content greater than 40%. According to the study, under summer conditions, the walls dried rapidly to below 30% in the first day, but under fall and spring conditions, the walls dried much slower and were still above 30% when the dry-wall was installed.

Waiting until the cellulose is dry to cover up is difficult with today's building construction schedules. If wet-spray applications are covered up too soon, moisture problems will occur. Not only does the insulation efficiency suffer, but moisture can

affect other building components, such as wood studs, drywall and metal building components which can suffer corrosion from moisture and salts. Moisture can also lead to a number of additional indoor air quality problems by promoting mold and mildew growth.

Air Infiltration

Thermal insulation, whether fiber glass or cellulose, when installed in side walls has very little to do with air infiltration. The U.S. Department of Energy estimates that up to 40% of a home's heat loss can be from air infiltration. But only 14% of the total loss from air infiltration occurs through side wall cavities, and most of that is around electrical outlets, a problem easily solved with inexpensive, easy-to-install electrical insulated outlet gaskets.

Air infiltration generally occurs in the areas of a home that are not insulated, such as around windows, doors, fireplaces, HVAC ductwork and perimeter joints. It can, and should, be controlled with the use of housewrap, proper caulking, and sealing of band joists, sill plates, header plates, and insulation around doors, windows, electrical outlets and other openings.

Recently there have been claims that some insulation products are better because they reduce air infiltration. Numerous research studies have been conducted to investigate this issue, among them studies by the National Association of Home Builders Research Center, researchers at Penn State University, and by a St. Louis utility. The research consistently demonstrated that if a wall cavity has been properly constructed,

using drywall, sheathing and caulking, very little air will flow through the wall cavity regardless of the type of insulation.

Environmental Benefits

As the environmental consciousness of Americans has been heightened, the building industry has responded. This kind of rethinking has led to a strong push to use building materials with lower environmental impact.

Fiber glass insulation manufacturers have responded to this call for conservation by using increasing amounts of recycled materials in their products. As an industry, fiber glass insulation manufacturers recycle more material by weight (glass cullet – up to 40%) than any other type of insulation used in the building and construction sector.

The environmental benefits of fiber glass insulation, however, go far beyond its recycled content when analyzed from a life-cycle perspective. A life-cycle analysis is an appraisal of the environmental impacts connected with a product through an examination of the product's environmental traits during many stages including pre-manufacturing; manufacturing; distribution/packaging; use, reuse, maintenance; and waste management. In reviewing each of these stages, a life-cycle evaluation of fiber glass clearly shows its environmentally beneficial attributes. As an example, consider fiber glass versus cellulose insulation.

Cellulose manufacturers claim environmental benefits, even though they may be removing newsprint from an existing recycling loop. More trees must be cut and more

energy used to make new newsprint and cardboard to make up for what has been used for cellulose insulation. And when it comes to insulating the same size home, pound for pound, it takes up to three times more cellulose than fiber glass to achieve the same insulating efficiency. Both insulations use the same amount of virgin material but the virgin material in fiber glass is sand – which is classified by the U.S. Environmental Protection Agency as a “rapidly renewable resource.”

NAIMA has developed a brochure outlining the various life-cycle characteristics that specifiers should consider in determining the most relevant attributes of an environmentally preferable insulation product: “Using Recycled Material Is Just the First Step...(N016).”

How can I be sure I'm getting the best performance from the insulation in my home?

Perhaps the most important consideration of all is the installation of the insulation. Regardless of the insulation type, the full R-value can only be achieved with proper installation. To help ensure the proper installation of fiber glass, rock and slag wool insulation, the North American Insulation Manufacturers Association (NAIMA) provides strong outreach support for professional contractors. It provides training programs to recruit, train and place men and women in careers as residential insulation installers. In addition, NAIMA acts as an industry resource for architects, builders, homeowners and the general public. If you intend to install fiber glass, rock wool or slag wool insulation yourself, follow product installation instructions carefully.

Are there rebates available for installing insulation?

Yes. Financial incentives are currently being offered in many states for the purchase and installation of insulation.

To find out about financial incentives in your area, visit www.simplyinsulate.com.

If I am adding more insulation to my home do I need to remove what I already have?

Since R-values are cumulative, there is no need to remove what you already have. By layering two different batts together, you get the combined R-value of both batts. For example, two layers of R-19 batts will give you a total of R-38. Be sure to use unfaced R-19, R-25 or R-30 fiber glass batts and lay them cross-wise to the existing insulation covering the joists. Do not put a product with a vapor retarder or facing on top of existing insulation. If there is no insulation in your attic, use R-30 or R-38 full width, faced batts, or fiber glass loose-fill installed to the required R-value.

FAQs ABOUT METAL BUILDING INSULATION

What is the benefit of adding insulation to a metal building?

Insulation provides energy savings, condensation control, noise control and enhanced light reflectivity that will remain with the building over the life of the structure.

Builders and designers are using NAIMA 202-96® fiber glass metal building insulation because it is a

technology that makes code compliance easier.

Are there guidelines for installing metal building insulation?

Yes. See NAIMA's publication Recommendations for Installing Fiber Glass Insulation in Metal Buildings (MB316).

What are NAIMA 202-96® Certified Metal Building Insulations?

NAIMA 202-96 Certified Metal Building Insulations are fiber glass insulations intended to be laminated, manufactured and marketed specifically for the metal building market. As such, they must meet the requirements of the NAIMA 202-96 standard. This standard is supported by NAIMA to assure that these insulations are distinguished from insulations produced for other uses. A copy of the standard is available from NAIMA or member companies: NAIMA 202-96 Standard For Flexible Fiber Glass Insulation to be Laminated for Use in Metal Buildings (MB311).

Why is it necessary to certify insulation for metal buildings?

All fiber glass insulations are not made the same and some are not designed for use in metal buildings. The requirements for metal building insulations are unique. Some fiber glass products made for other purposes are being offered and used in metal buildings. After laminating they may not deliver the same thermal performance and integrity as NAIMA 202-96 insulations.

What requirements must an insulation meet to be certified for metal buildings?

NAIMA 202-96 insulation must have additional tensile strength and greater thickness recovery after compression. When a vapor retarder facing is applied to the blanket, the insulation is compressed and tightly wound in rolls for shipment or storage. It takes a special manufacturing process to give it the structural integrity it needs to recover thickness and withstand the rigors of shipping and installation. This process is used by NAIMA Metal Building Committee members for NAIMA 202-96 insulations to meet these extra requirements.

Who certifies NAIMA Metal Building 202-96 insulations?

The National Association of Home Builders (NAHB) Research Center makes quarterly unannounced inspections of NAIMA member plants where they witness quality control procedures and records. Then they test randomly selected specimens of products from stock. Tests are conducted in accordance with ASTM (American Society for Testing and Materials) methods on the factors that affect thermal performance, such as thickness and thermal resistance. During an in-plant inspection, the weight, length, width, thickness, and thermal conductivity of each product are measured. The results must meet the requirements of the NAIMA 202-96 Standard in order to be certified. Additional tests are performed by Underwriters Laboratories and other laboratories according to ASTM methods for fire hazard classification, odor emission,

corrosiveness and moisture sorption. All test requirements are detailed in the NAIMA 202-96 Standard.

How can I be sure of getting NAIMA 202-96 Certified Metal Building Insulation?

Fiber glass insulations that are made to the NAIMA 202-96 Standard and certified to the NAHB Research Center criteria are imprinted on the surface of the insulation opposite the facing with “NAIMA 202-96 (Rev. 2000),” the R-value and the NAIMA member company. “(Rev. 2000)” denotes the date of the most recent version of the standard.

Where can I buy and how should I specify?

Member companies sell unfaced imprinted NAIMA 202-96 Certified Metal Building Insulations nationwide to qualified independent laminators. They are experienced in providing NAIMA 202-96 certified insulations faced with a choice of attractive light-reflective vapor retarder facings in widths and lengths to fit specific building needs. Make sure to specify NAIMA 202-96 Certified Metal Building Insulations with the NAIMA 202-96 imprint on the surface of the insulation.

Which NAIMA members sell metal building insulation?

CertainTeed Corporation, Knauf Fiber Glass, Johns Manville, and Owens Corning.

FAQs ABOUT COMMERCIAL INSULATION

What is the benefit of adding insulation to a plant or industrial facility?

Insulation brings fast return to plants and industrial facilities looking to reduce energy consumption, save costs, and minimize emissions output. These benefits help owners and operators comply with codes, and meet standards for energy efficiency tax breaks and other incentives. NAIMA’s 3E Plus® software program helps owners and operators quickly assess the economic and environmental impacts of adding insulation to a facility. For more information on this free software tool visit www.PipeInsulation.org.

What is the payback of insulating an industrial plant?

Payback varies based on the type of facility, fuel type and a number of other factors. NAIMA’s free 3E Plus® software can help assess the payback on adding insulation to an existing or new facility. NAIMA and NIA have also created case studies of facilities that have enjoyed the benefits of increased insulation. To read about these real-world examples see the following publications.

- Facts #51 – Insulation Upgrade Program Reduces Fuel Costs and Increases Process Efficiency at Georgia-Pacific Plant (CI211)
- Slashing Steam-System Costs (RP049)

FAQs ABOUT AIR HANDLING SYSTEMS

What types of insulation are available for air handling systems?

Fiber glass insulation comes in four forms for air handling systems – Duct Board, Duct Liner, Commercial Duct Board and Duct Wrap. Each has specific uses and benefits.

What are the benefits of fiber glass insulation in air handling systems?

Occupant comfort is the goal of an air handling system, and fiber glass duct insulation is a key component of providing these benefits. Fiber glass insulation products help maintain a consistent air temperature throughout the system, reduce condensation and the opportunity for microbial growth, absorb noise from the system’s operation and conserve energy.

Does insulation cause mold in air handling systems?

Fiber glass insulation helps to reduce moisture accumulation in ducts, which in turn, helps to prevent mold growth. The fact is, mold will grow on any surface if water and food are available, and if the right temperature is achieved. Since food sources and appropriate temperatures are found in virtually every duct system, controlling moisture is the key to controlling mold. Fiber glass insulations help to minimize condensation by maintaining a consistent temperature throughout the system.

How can I learn to fabricate and install fiber glass duct board?

Fabrication of duct board requires a trained craftsman and skills need to be refreshed periodically to ensure quality fabrication and installation. NAIMA supports duct board fabrication training through a variety of sources. Additionally, contractors can read more about proper fabrication and installation in several of NAIMA's brochures on air handling. Visit NAIMA's web site for more information.

FAQs ABOUT INSULATION AND THE ENVIRONMENT

How do fiber glass and rock and slag wool insulations benefit the environment?

Fiber glass and rock and slag wool insulations benefit the environment in a number of ways. Insulation is a key to energy efficiency in commercial, residential and industrial facilities of all kinds. Insulation in factories can help reduce emissions of green house and other gases, and reduce energy consumption. Because these products use a high level of post-consumer, recycled products, NAIMA members help reduce reliance on virgin resources.

How do I know which insulation products are the most environmentally-friendly?

There are a number of so-called green products on the market, but to be truly environmentally friendly a

product must do more than just use recycled goods. Fiber glass and mineral wool insulation manufacturers have improved their manufacturing processes to reduce transportation loads and energy usage. Because these products are highly compact, fewer bags are needed on the jobsite and packaging these products creates less waste.

Fiber glass relies on post-consumer glass and uses millions of pounds every year, creating one of the largest markets for recycled glass according to the Glass Packaging Institute. Since glass is made from sand, any new glass used in insulation comes from a rapidly renewable resource, unlike insulation products that rely on secondary wood products as their base material.

Slag wool insulation uses raw materials derived from a secondary source – blast furnace slag – and does not deplete any natural resources. In many cases, NAIMA members recover blast furnace slag from landfills to use in their manufacturing process.

GLOSSARY OF INSULATION INDUSTRY TERMS

1 f/cc – One fiber per cubic centimeter of air. On this site, 1 f/cc refers to the permissible exposure limit identified as the appropriate exposure level for fiber glass and rock and slag wool insulation products to significantly reduce potential irritation to throat and eyes.

Batts – Pre-cut pieces of fiber glass insulation; batts may have a facing of paper or aluminum foil.

Blow-in-Blanket Systems® (BIBS) – A patented application process that com-

bines loose-fill insulation with a fine adhesive mist, then blows it into a home's cavities behind netting.

Cavity – The empty space between studs or joists to place insulation batts.

Energy Audit – A thorough assessment of a home's thermal efficiency, often conducted free of charge by most utility companies.

Energy Efficient Mortgage (EEM) – A special type of mortgage that takes into account the monthly operating cost savings realized by living in an energy-efficient home, thereby enabling mortgage underwriting guidelines to be adjusted to reflect the economic effect of lower monthly payments for energy.

Face Staple – Stapling facing flange to the front side of a stud or rafter, along the 1-1/2" dimension.

Faced Insulation – Insulation with an attached vapor retarder (kraft paper or foil-backed paper).

Fiber Glass or Glass Fibers – Glass in a strand form.

Fiber Glass Insulation – An effective resistor of heat flow that is spun from molten sand and recycled glass into fibers.

High-Performance Insulation – Fiber glass insulation with densely packed fibers, resulting in higher R-values for a given thickness. Most commonly used in confined spaces such as walls or cathedral ceilings.

HSPP – Health and Safety Partnership Program, NAIMA's voluntary worker protection program developed in concert with OSHA.

HVAC – Acronym for Heating, Ventilation and Air-Conditioning systems

Inset Staple – Stapling to the inside portion of the stud or rafter.

Insulation Density – Denser insulation products have more fibers per square inch and, therefore, give you greater insulating power through higher R-values.

Insulation – A material used to separate the interior of your home from the outside environment, thereby preventing the transfer of heat.

Loose-Fill Insulation – Particulate insulation, made from either fiber glass or cellulose, that is blown into a home using a motor and hose

Man-Made Vitreous Fibers (MMVF) – (See also SVF) A generic term for a group of man-made materials reflecting the glassy, non-crystalline nature of these materials. This group was historically referred to as man-made vitreous fibers. Most definitions include fiber glass and rock and slag wool products used to make insulation in this category.

Mineral Wool – A broad term used to refer rock wool and slag wool.

NAIMA – North American Insulation Manufacturers Association, a trade organization representing manufacturers of fiber glass and rock and slag wool insulation products in North America.

R-Value – Measure of resistance to heat flow. Insulation materials have tiny pockets of trapped air. These pockets resist the transfer of heat through material. The ability of insulation to slow the transfer of heat is measured in R-values. The higher the R-value, the better the insulation material's ability to resist the flow of heat through it.

Rock Wool – Man-made material comprised of natural minerals like basalt or diabase.

Slag wool – Man-made material made primarily from iron ore blast furnace slag.

Synthetic Vitreous Fibers (SVF) – (See also MMVF) A generic term for a group of man-made materials reflecting the glassy, non-crystalline nature of these materials. This group was historically referred to as man-

made vitreous fibers. Most definitions include fiber glass and rock and slag wool products used to make insulation in this category.

Sound Transmission Class (STC) – A numerical rating of the sound control performance of a wall or ceiling; the higher the number, the better the sound control.

Stapling Flange – A protruding edge on faced insulation used to staple the insulation to the framing.

Unfaced Insulation – Insulation with no attached vapor retarder.

Vapor Retarder – Helps control the amount of moisture passing through the insulation and collecting inside exterior walls, ceilings and floors.

NAIMA is the association for North American manufacturers of fiber glass, rock wool, and slag wool insulation products. Its role is to promote energy efficiency and environmental preservation through the use of fiber glass, rock wool, and slag wool insulation, and to encourage the safe production and use of these materials.

In May 1999, NAIMA began implementing a comprehensive voluntary work practice partnership with the U.S. Occupational Safety and Health Administration (OSHA). The program, known as the Health and Safety Partnership Program, or HSPP, promotes the safe handling and use of insulation materials and incorporates education and training for the manufacture, fabrication, installation and removal of fiber glass, rock wool and slag wool insulation products.

For additional information contact:

NAIMA
44 Canal Center Plaza, Suite 310
Alexandria, VA 22314
Tel: 703/684-0084
Fax: 703/684-0427
Web site: www.NAIMA.org



Facts About Fiber Glass Loose-Fill Insulation

Information from NAIMA

In this issue, we review performance, material and installation information with regard to fiber glass loose-fill insulation.

Materials

Fiber glass loose-fill insulation is made from molten glass spun or blown into fibers that are then processed into the final product. It is an effective insulation and meets the requirements of ASTM C 764 - Mineral Fiber Loose-Fill Thermal Insulation. Fiber glass loose-fill insulation is inorganic and noncombustible. In addition, the fibers will not rot or absorb moisture and do not support the growth of mildew, mold or fungus.

Fiber glass loose-fill insulation is available in two forms - either processed from a by-product of manufacturing batts or rolls, or from "prime" fibers produced especially for blowing applications. Both must be applied through pneumatic means using a mechanical blowing machine.

Fiber glass loose-fill insulation is designed for "open blow" applications such as attic spaces or closed cavity applications such as those found inside walls or covered attic floors.

In both applications, to achieve the correct R-value it is extremely important that the proper weight and thickness of materials be installed.

Material Performance Requirements, ASTM C 764

ASTM C 764 Material Performance Standards provide the following:

Thermal Characteristics

"R" means resistance to heat flow. The thermal resistance (R) for the average of any four randomly selected samples shall not be more than 5% below the listed R-value when tested in accordance with ASTM C 177-04 or ASTM C 518-04, nor shall any single specimen be more than 10% below the listed R-value. R-values other than those listed shall be as agreed upon between the supplier and the purchaser. NOTE: Resistance values for side walls shall be tested at the density intended for closed application.

Critical Radiant Flux

Fiber glass loose-fill shall have a critical radiant flux-flame propagation resistance of ≥ 0.12 W/cm² when tested in accordance with ASTM E 970.

Combustion Characteristics

Fiber glass loose-fill shall pass when tested in accordance with ASTM E 136.

Moisture Vapor Sorption

The moisture vapor sorption of the fiber glass loose-fill insulation shall not be more than 5% by weight when tested in accordance with ASTM C 1104.

Odor Emission

When tested, a detectable odor of objectionable nature recorded by more than two of the five panel members shall constitute rejection of the material.

Corrosiveness

When tested, the metal plates that are in contact with the insulation shall show no corrosion greater than the comparative plates tested in the same manner in contact with sterile cotton.

Proper Application Of Fiber Glass Loose-Fill

Coverage – Determining the Proper Amount

The thermal resistance (R-value) of fiber glass loose-fill is dependent on the proper application of the required quantity of material. One of the most significant criteria for achieving the desired R-value is meeting the designated minimum weight per square foot of material. It is also important that at least the minimum thickness be achieved, since this, along with the required weight per square foot of material, is essential to obtain the desired R-value. The correct values for coverage for each loose-fill material are stated by the manufacturer in a bag label specifications chart similar to Table 1 depicted below.

Before loose-fill insulation is installed, the area to be insulated is measured. Framing adjustments may be permissible in determining the net insulatable

area. From these calculations, the required number of bags or pounds of insulation is determined from the bag label chart for the desired R-value.

It is important that the correct number of pounds or bags of loose-fill insulation be installed in order to assure that the desired R-value is achieved. This holds true in both open and closed blow installations.

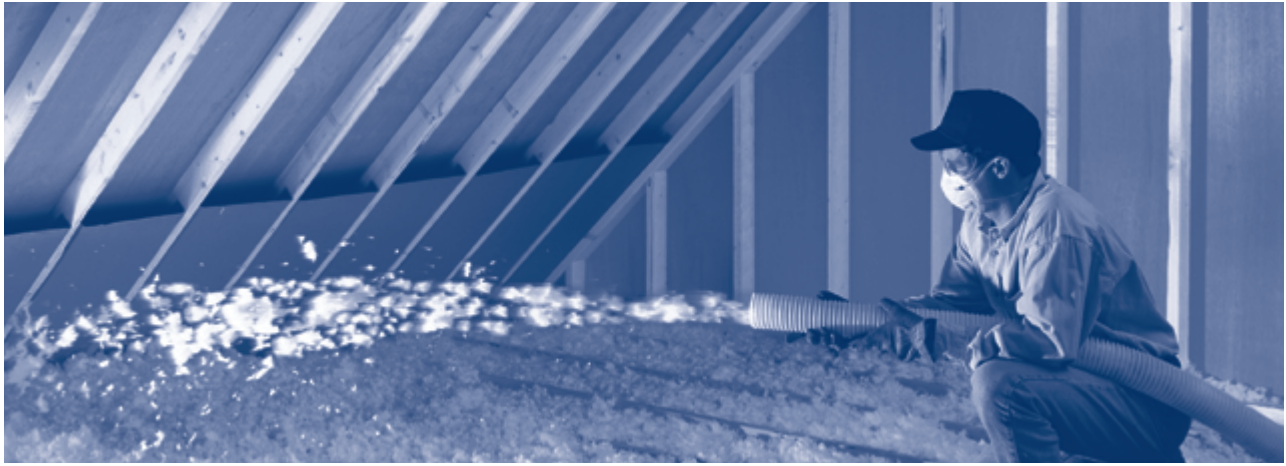
Installed R-Value Of Attic Insulation

Thickness must not be used as the sole factor in determining the R-value of loose-fill insulation. When blown-in insulation is properly installed (at the recommended weight per square foot or bags per 1000 sq. ft.), it may have an “installed thickness which is greater than the stated minimum thickness.” This is sometimes described as “overblow.” If the correct number of bags is installed and the thickness exceeds the minimum

Table 1: Coverage Chart

R Value at 75°F Mean Temperature _____	Maximum Net Coverage _____	Minimum Thickness _____	Minimum Weight per ft ² _____	
To obtain an insulation resistance (R) of:	Minimum bags per 1000 ft ² net area	Maximum ft ² coverage per bag	Installed insulation should not be less than:	The weight per ft ² of installed insulation should be not less than:
Attic:				
49	_____ bags / MSF	_____ feet ²	_____ in. thick	_____ lb/ft ²
38	_____ bags / MSF	_____ feet ²	_____ in. thick	_____ lb/ft ²
30	_____ bags / MSF	_____ feet ²	_____ in. thick	_____ lb/ft ²
22	_____ bags / MSF	_____ feet ²	_____ in. thick	_____ lb/ft ²
19	_____ bags / MSF	_____ feet ²	_____ in. thick	_____ lb/ft ²
13	_____ bags / MSF	_____ feet ²	_____ in. thick	_____ lb/ft ²
Sidewalls: R-	_____ bags / MSF	_____ feet ²	_____ in. thick	_____ lb/ft ²

Each manufacturer fills in the necessary data based upon manufacturers’ particular product. Note – Chart may be given in metric units.



thickness, the labeled R-value will be achieved.

If these products were installed at the minimum thickness, the overblow would produce a coverage per bag which would exceed the maximum net coverage shown on the bag label, *but* the weight per square foot would be less and the R-value would be below the intended R-value. If an installer used the “overblow” to stretch the coverage of the insulation while maintaining at least the *minimum thickness*, the installation would most likely have an R-value below that shown on the R-value chart.

However, if the thickness installed using the correct number of bags is less than the stated minimum, then additional material must be added to bring the installed thickness up to the required minimum thickness.

The in-place performance of all insulation materials will vary due to installation quality, temperature difference, framing or other factors. For example, as the attic gets colder, the thermal performance of insulation generally improves. At very large temperature differences between the inside conditioned space and

attic, porous insulations can experience a reduction in thermal performance.

Laboratory attic tests have shown that while fiber glass batts experience an increase in thermal performance at cold winter attic temperatures, light density loose-fill products experience an initial increase in thermal performance but then may suffer a reduction as attic temperatures drop further. Contact the manufacturer of your attic insulation for more information on the product’s thermal performance at cold winter temperatures in your climate.

Inspection Of Loose-Fill Attic Insulation

It is important for the consumer to receive full R-value for the insulation installed. One way to determine that the exact amount of insulation (either in pounds or bags) has been installed is by counting the empty insulation bags and comparing that number with the number of bags originally calculated for the job. Another way is to obtain a receipt documenting the installed weight of loose-fill insulation.

Procedures are available for measuring the amount of insulation installed. These involve taking measurements of thickness, removing and weighing a known area of insulation, and calculating the weight per square foot of the insulation. The measured weight per square foot and the installed thickness are then compared to the value shown on the manufacturer’s label. Meeting or exceeding the labeled values assures that the proper R-value has been achieved. These physical inspection methods are generally only effective when one type or layer of insulation is installed.

Required Consumer Information

FTC Home Insulation Rule

The United States Federal Trade Commission’s Labeling and Advertising of Home Insulation Rule requires installers to provide customers (builder or consumer) with a signed and dated contract or receipt for the insulation installed. The receipt for loose-fill must show the type of insulation, coverage area, initial installed thickness, minimum

settled thickness, R-value and number of bags used³. The manufacturer must also provide a manufacturer's fact sheet. The fact sheet for loose-fill insulation must contain, in addition to the manufacturer's name, address and type of insulation, a chart containing the R-value and coverage information contained in Table 1. Installers must have this information and must show it to customers before they agree to buy the insulation.

A new-home seller must put the following information in every sales contract: the type, thickness, and R-value of the insulation that will be installed in each part of the house.

Package Labeling

All loose-fill fiber glass insulation is packaged in polyethylene bags. Whether pre-printed on the insulation bag or included on the package label, each package should contain a chart showing the following information according to the FTC Home Insulation Rule:

- Minimum settled thickness.
- Initial installed thickness.
- Maximum net coverage.
- Number of bags per 1,000 square feet.
- Minimum weight per square foot at R-values of 13, 19, 22, 30, 38 and 49. If any additional values are listed on the chart, the same information noted above must be included for each R-value.
- Minimum net weight of the insulation in the package.
- Blowing machine setting used to derive the initial installed thickness information⁴
- This statement: "R means resistance to heat flow. The higher the R-value the greater the insulating power."²

If insulation instructions are included on the label or with the package, the label should state: "To get the marked R-value, it is essential that this insulation be installed properly. If you do it yourself, follow the instructions carefully."⁴

If no instructions are included, the package should include this statement, "To get the marked R-value, it is essential that this insulation be installed properly. If you do it yourself, get instructions and follow them carefully. Instructions do not come with this package."⁵

ASTM C 764-02 makes the following recommendations for package labeling:

- Name, address and phone number of the manufacturer
- Type and category of insulation
- Net weight of insulation per bag
- The manufacturer recommended application instructions, including complete coverage charts
- Listing of testing criteria and compliance standards which are applicable to fiber glass loose-fill insulation
- Certification that states the following: This insulation has been installed in conformance with the above recommendations to provide a value of R-____ using ____bags to cover____ square feet of area*

- Place for builder's signature, company name and date*
- Place for applicator's signature, company name and date*
- Where material is intended for open or closed blowing application, the bag shall have a separate coverage chart for each type of application⁶

** These recommendations may be satisfied by a separate attic card containing the same information.*

Hiring A Professional Contractor

In publications distributed to homeowners, NAIMA advises them on selecting a contractor and dealing with him and his application crews. Here are examples of these general guidelines from one publication:

If you prefer to hire an insulation contractor, you can find one by (1) contacting the Insulation Contractors Association of America (ICAA) at www.insulate.org for a list of certified contractors in your area, (2) asking your utility company for a list of reputable contractors, (3) consulting friends and neighbors, or (4) looking in the phone book "Yellow Pages" under "Insulation Contractors - Cold & Heat" or a similar heading.

Remember that a contractor has the special skills needed to insulate sidewalls as well as to do an expert job of insulating ceilings and floors.

The next step is to call in two or three contractors to quote your job. You should judge a contractor's reliability as well as his price. Here are some suggestions for choosing a contractor:

- 1 Check a contractor with the local Better Business Bureau.



Or, ask your bank to get a report on his credit rating.

2 Ask a contractor for references, including other homeowners for whom he has done work. Check them out.

3 Give all the contractors exactly the same description of what you want done. For example, say, “I want to add R-19 to my attic floor,” then stay with that specification and that way of saying it. Don’t be satisfied if a contractor says, “Okay, I’ll add 6 inches.” Why not be satisfied with 6 inches of insulation? Because not all brands of insulation have the same heat-retarding ability – 6 inches of one brand might not be the same as 6 inches of another. Stick with R-values. If a contractor won’t deal with you in R-value language, look for another insulating contractor.

4 If a contractor is going to use blowing wool in your attic, how can you tell if you’re getting R-38 performance, or R-30, or R-19 – whatever thermal resistance rating you decide you want? First of all, make sure the written contract states the number of bags of insulation to be used and the R-value to be achieved. In addition, check the bag label yourself. As previously mentioned, ASTM C 764 recommends that each bag of fiber

glass loose-fill insulation be labeled with technical information, including the maximum net coverage per bag of the particular insulation for all commonly specified R-values. ASTM C 739 requires a similar label for cellulose.

The coverage figure gives you a means of knowing the minimum number of bags of insulation the contractor should blow into your attic floor to achieve a particular R-value. The overall area of the attic floor should be divided by the maximum net coverage per bag corrected for the space occupied by the floor joists. Ask the contractor to show you the correction factors for different joist sizes, joist spacings, and R-values as calculated by the insulation manufacturer.

When you talk to a contractor’s salesman, ask him to show you the bag label for his brand of insulation and explain it to you. And, as was recommended in an earlier section, when the job is being done, stay home and count the number of bags actually used.

If a contractor uses insulation packed in bags that aren’t labeled, don’t hire him. The quality of the material will be unknown.

5 Ask the contractor how he pays his installers – by the number of square feet they cover or by the hour. If he pays them by

square footage, they might do a hasty job on your house just so they can get on to the next one.

6 Ask a contractor about the insurance he carries. Does he have insurance to protect his own men if they are injured? Are you covered if one of his men damages your house?

References

1. 16 CFR § 460.12 (b) (2)
2. 16 CFR § 460
3. 16 CFR § 460.17
4. 16 CFR § 460.12 (d)
5. 16 CFR § 460.12 (e)
6. ASTM C 764-02

ABOUT NAIMA

NAIMA is the association for North American manufacturers of fiber glass, rock wool, and slag wool insulation products. Its role is to promote energy efficiency and environmental preservation through the use of fiber glass, rock wool, and slag wool insulation, and to encourage the safe production and use of these materials.

For additional information on building insulation contact:

NAIMA

**44 Canal Center Plaza, Suite 310
Alexandria, VA 22314
Tel: 703/684-0084
Fax: 703/684-0427
www.naima.org**

NAIMA BUILDING INSULATION COMMITTEE MEMBERS:

CertainTeed Corp.
PO Box 860
Valley Forge, PA 19482
800-233-8990

Guardian Building Products, Inc.
P.O. Box 207
Greenville, SC 29602
800-569-4262

Johns Manville
PO Box 5108
Denver, CO 80217-5108
800-654-3103

Knauf Insulation
240 Elizabeth Street
Shelbyville, IN 46176
800-825-4434

Owens Corning
One Owens Corning Parkway
Toledo, OH 43659
800-GET-PINK

The Facts About Insulation And Air Infiltration

Information from NAIMA

In recent years, there has been some debate over which insulation products are better at reducing air infiltration. In this issue, we discuss the results of several studies which support the conclusion that insulation plays a very insignificant role in controlling air infiltration.

Introduction

With energy conservation becoming an important priority, today's builders are focusing more closely on controlling the heat loss in a home and looking for reliable information concerning the control of air infiltration to achieve energy efficiency.

Causes of Heat Loss

The major causes of heat loss in buildings are:

1. Heat moving through the pieces of the building envelope (i.e. walls, ceilings, floors, doors and windows) by conduction. Conduction is the same physical principal that causes the handle of a spoon to gradually heat up when placed in a cup of hot water. Insulating the walls, ceilings and floors slows down this heat flow and keeps the heating energy inside the building

longer, which reduces heating costs.

2. Warm air leaking through holes and gaps in the building envelope is called air infiltration and, depending on the size of the holes, can cause significant energy losses. Sealing the building envelope with caulk, foam, tape and an air barrier and installing tightly built doors and windows keeps warm air from leaking out of the building and also reduces heating costs.

Air Infiltration

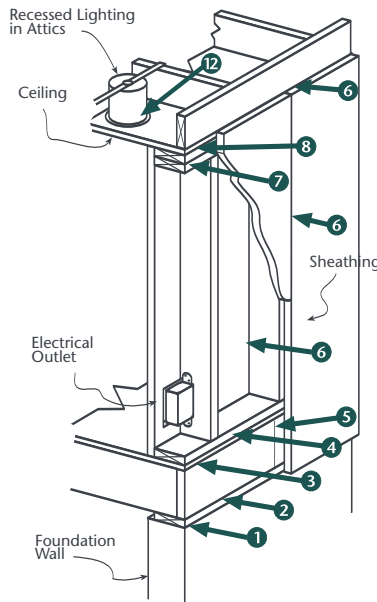
Air infiltration is driven by wind, temperature differences, or HVAC appliance-induced pressures. Research has shown that up to 35% of the heat loss in a home can be attributed to air infiltration. Most of the air that passes through the exterior wall assembly of a home does so



by way of seams and interfaces between rigid framing and sheathing components, where the infiltrating air never encounters insulation.

Figure 1 shows the typical leakage paths through an exterior wall of a residential building.

Figure 1
Air Infiltration Paths



1. Sill plate/foundation wall interface
2. Sill plate/band joist interface
3. Band joist/sub-floor interface
4. Bottom plate/sub-floor interface
5. Band joist
6. Sheathing joists/stud/cavity
7. Double top plate interface
8. Top plate/ceiling interface
9. Windows and doors (not shown)
10. Window and door frames/rough opening surface (not shown)
11. Electrical/telephone/plumbing /cable intrusions (not shown)
12. Recessed lighting in attics

Air Leakage and Cellulose

Numerous claims have been made by cellulose manufacturers about the superiority of

their products in limiting air leakage in a home.

The fact is that cavity insulation, whether it is cellulose or fiber glass, plays virtually no role in blocking air infiltration through the walls of a home. The only way to stop air infiltration is to properly seal the building envelope.

Tests conducted over a number of years (see below) have concluded that fiber glass and cellulose are equal in their impact on air infiltration. The difference between the two is insignificant when compared to the overall leakage through the other components of a home.

NAHB/EPA Study (1997)

The results of a study¹ conducted by the National Association of Home Builders (NAHB) Research Center for the U.S. Environmental Protection Agency's Energy Star Homes Program concluded that alternative residential insulation products do not significantly reduce air leakage.

The study determined that the individual air sealing practices of the insulators had a larger impact on air leakage than the insulation products themselves.

The study compared the performance of fiber glass batt insulation to three alternative products — wet-spray cellulose, blown-in fiber glass (referred to as "Blow-In-Blanket Systems" or BIBS) and low density polyurethane foam insula-

tion (also referred to as spray-applied foam or polyisocyanate).

Fiber glass batts, wet-spray cellulose, blown-in fiber glass and polyisocyanate were installed in 26 similar homes in Maryland and Virginia.

The study measured such factors as house tightness by insulation type, labor time required to install the various insulations and total installed cost to reach the specified values of R-30 in the attic and R-13 in the walls of the homes.

When compared to fiber glass batts, the study found that the alternative insulation products did not significantly reduce air leakage in the homes studied. Based on the data, the study could find no significant relationship between the type of insulation used and the amount of air infiltration.

The NAHB/EPA study confirms² what a lot of builders suspect: it pays to be less concerned about the type of insulation being used, and more concerned about how the home is detailed.

G.K. Yuill Study (1996)

A 1996 study conducted by Penn State University professor G.K. Yuill, Ph.D.,³ tested fiber glass batts and wet-spray cellulose insulations for resistance to air flow through the wall cavities of two houses. Based on the test data, the researchers found it impossible to determine which insulation material provided a more air-

tight structure and concluded that the difference between the two types of insulation had little influence on the air tightness of a house.

The data showed that most of the resistance to air flow through a house's walls is provided by drywall and not insulation. Drywall contributes about 77% of the total resistance of the wall, the sheathing and siding about 12% and the insulation about 11%. The study made it clear that any difference between the two insulations was insignificant when compared to the overall leakage through the other components of a house.

Small differences in workmanship elsewhere in a house are likely to be more significant than differences in the air permeability of wall insulation.

Union Electric Study (1995)

A study initiated in 1995 by a St. Louis, MO utility company, Union Electric,⁴ tested seven homes for air infiltration. It concluded that a properly installed sealant package can significantly reduce air infiltration and save energy in a home regardless of the insulation installed (fiber glass or cellulose).

The purpose of the study was to determine the effects of different types of insulation on the air changes, operating costs and comfort level of a home.

The study found that a sealant package can decrease

air infiltration by more than 50 percent compared to a home that does not have one. In field tests, fiber glass and cellulose insulation were considered equal in their impact on air infiltration, leading to the conclusion that air infiltration is dependent upon the sealant package, not the insulation material type.⁴

Holometrix Study (1994)

Another study that examined the role stud cavity insulation plays in house air infiltration was conducted by Holometrix, an independent accredited laboratory in Bedford, Massachusetts.⁵

For the study, test wall sections were insulated with fiber glass batts, loose-fill, and spray-on cellulose. Slight air leakage through the pressurized test walls occurred with each of the insulation systems at a rate of about 0.02 cu.ft. per minute per sq. ft. for each sample.

The addition of an air infiltration barrier to each test wall resulted in a measurable reduction in air leakage in every case, indicating the cavity insulation was not effective in controlling the air leakage.

Alberta Study (1990)

A field study conducted in Alberta, Canada⁶ included air leakage tests which indicate that spray cellulose provides some resistance to air flow but is not an effective air barrier. The air blocking charac-

teristics of cavity insulation (density claims) were of little consequence because, as the tests verified, sheathing and drywall are substantially better air barriers than any cavity insulation. Air infiltration barriers and polyethylene are installed for this specific purpose.

Colorado Study (1990)

For this study,⁷ two test buildings were constructed on the University's campus. Walls in building "A" were insulated with 5-1/2 inches of wet-spray cellulose; and walls in Building "B" were insulated with R-19 fiber glass batts.

An independent review of the study by David Yarbrough Ph.D., PE of R&D Services, Inc., Lenoir City, TN, a long-time insulation researcher with Tennessee Technological University and Oak Ridge National Laboratory, states that the facts do not support the conclusion that cellulose insulation limited the air leakage in a building.

Yarbrough states that he sees major deficiencies in the study. He says that "Comparative studies...must characterize the structures used and the materials used in order to eliminate the possibility that differences observed are the result of construction or mismatch of the thermal values of installed insulation. Specification of nominal insulation R-values is not sufficient for a serious thermal study."

He adds that the Colorado study “illustrates the difficulties associated with large-scale thermal studies.”

The report reveals that blower door tests were conducted with no wallboard on the walls. Wallboard is a critical element for reducing air infiltration.

In addition, the testing did not isolate the effects of floor tightness, window tightness and door seals. Therefore, it is likely that some or all of the difference in air infiltration could be attributed to these sources. There is no data to prove that these factors were even considered.

From an energy standpoint, the study concludes the building insulated with cellulose used less heating energy during the test period. However, according to Yarbrough “The reasons for the lower heating energy usage of the building insulated with cellulose cannot be identified in the study.”

Yarbrough suggests that the 26.4% difference in energy usage “could be explained by the difference in the insulation R-values that were used.”

According to Yarbrough, “[Since] the thermal resistances of insulation materials actually installed were not reported ... there is good reason to believe that the thermal resistance of the installed cellulose was greater than the thermal resistance of the installed fiber glass in both the walls and attics of the test units.”

Conclusion

While insulation plays a significant role in energy savings in a home, its role in reducing air infiltration is negligible.

Minimizing air infiltration is dependent on the sealant package, not the insulation.

As these studies have shown, there is little difference between fiber glass and other insulations when it comes to blocking air infiltration through walls.

If a wall cavity has been properly closed off using dry-wall, sheathing, and caulking, very little air will flow through regardless of the type of insulation used.

References

1. *Field Demonstration of Alternative Wall Insulation Products*. Prepared for U.S. Environmental Protection Agency by NAHB Research Center, Inc., November 1997.
2. *Does Insulation Choice Really Affect Infiltration?* Energy Design Update, July 1997 Edition, page 6.
3. *A Field Study of the Effect of Insulation Types on the Air Tightness of Houses*. G.K. Yuill, Ph.D., Pennsylvania State University Department of Architectural Engineering, 1996.
4. Research and Development Project, “Maple Acres,” Union Electric, St. Louis, Missouri. William Conroy, division marketing supervisor, 1995.
5. *Effect of Cavity Insulation, Vapor Retarders, and Air Retarders on Air Infiltration of Residential Walls*. Prepared for NAIMA by Holometrix, an independent testing laboratory, 1994.

6. *Field Monitoring of Cellulose in Walls-Edmonton*, for CMHC, Project Implementation Division, prepared by John A. Vlooswyk, Building Envelope Engineering, January 8, 1990.

7. *Fiber Glass vs. Cellulose Installed Performance*, Soontorn Boonyartikarn, Arch D., and Scott R. Spiegle, M. Arch, University of Colorado Graduate School of Architecture, 1990.

About NAIMA

NAIMA is a trade association of North American manufacturers of fiber glass, rock wool, and slag wool insulation products. NAIMA's role is to promote energy efficiency and environmental preservation through the use of fiber glass, rock wool, and slag wool insulation products and to encourage safe production and use of these insulation products.

For additional information on building insulation contact:

NAIMA
44 Canal Center Plaza, Suite 310
Alexandria, VA 22314
Tel: 703/684-0084
Fax: 703/684-0427
E-mail: insulation@naima.org
Website: <http://www.naima.org>

NAIMA BUILDING INSULATION COMMITTEE MEMBERS:

CertainTeed Corporation
PO Box 860
Valley Forge, PA 19482
800/233-8990

Johns Manville
PO Box 5108
Denver, CO 80217-5108
800/654-3103

Knauf Fiber Glass
One Knauf Drive
Shelbyville, IN 46176
800/825-4434

Owens Corning
One Owens Corning Parkway
Toledo, OH 43659
800/GET-PINK

MYTH #1

**Certain types of insulation
are air barriers**

REALITY

The home is a system. No cavity insulation **ALONE
is capable of providing a continuous air barrier.**

It's a two step process. The sill plates need to be sealed and lengthwise stud cavities should be caulked. There needs to be good attention to detail around pipes/openings. This applies to all insulation – spray-applied foams, fiber glass, mineral wool and cellulose, etc. Studies done by NAHB and others confirm that with proper air sealing, various insulations perform equally.

NAIMA
NORTH AMERICAN INSULATION
MANUFACTURERS ASSOCIATION

**STAY
TUNED!**



Insulation = Air Infiltration.



Insulation = Thermal Performance.

No insulation plays a major role in blocking air infiltration through the walls of a home. Resistance to air flow through walls is primarily done by gypsum board (77%)* and sheathing, siding or housewrap (12%)*. The rest comes from proper sealing of the building envelope and the numerous gaps and penetrations to the outside such as pipes, ducts, and flues. Many of these areas can be difficult or impractical to seal with spray-foam insulation, and may require caulking or other sealing measures. Don't be fooled. Air infiltration is not about insulation.

NAIMA
NORTH AMERICAN INSULATION
MANUFACTURERS ASSOCIATION

**STAY
TUNED!**

MYTH #3

Skimming the wall cavity with spray-applied insulation completely solves air infiltration

REALITY

Everyone knows the house is a system. Spray-foam inside a cavity does not come close to stopping all air leakage.

Air infiltration happens all over the house with the wall cavities only contributing a small amount (14%^{*}). To solve air infiltration you need to address air flow throughout the structure, with the most important places being gypsum board, gaps, and penetrations, not the cavity. Spray-foam insulation in a typical application is not a continuous air barrier. For that you need to seal under sill plates, fill band joists, and seal around penetrations such as recessed lights and electrical boxes. If the foam shrinks, that seal could be lost. Fiber glass insulation with an air barrier or skim coating provides a high performance wall with excellent thermal performance and minimal air leakage at a cost effective price point.

NAIMA
NORTH AMERICAN INSULATION
MANUFACTURERS ASSOCIATION

**STAY
TUNED!**

MYTH #4

Spray-foam insulation is a one step solution to air leakage

REALITY

No cavity insulation **ALONE** is capable of providing a continuous air barrier.

While spray-foam insulation products can be used to fill gaps and voids, they are not always applied that way and don't always solve all air leakage problems. Achieving a continuous air barrier with spray-foam insulation can be a very costly solution and something that may not be feasible if framing techniques keep some areas from being completely sealed. If your insulation provider is claiming that they provide a "one-step" solution, look again. For an effective solution to air infiltration and thermal performance, choose fiber glass batt, loose fill or spray-applied insulation with a continuous air barrier outside or a skim coating inside. This is common building practice that is high performing and cost effective.

NAIMA
NORTH AMERICAN INSULATION
MANUFACTURERS ASSOCIATION

**STAY
TUNED!**

MYTH #5

R-value doesn't matter.

REALITY

**According to the Federal Trade Commission,
"R-value 'is the only quantifiable...measure of thermal
resistance that might provide the typical consumer
with a means to evaluate insulation products'."**

Any claim that R-value may be discounted or enhanced for air infiltration capabilities is false and misleading. There is no provision or language within the FTC R-value Rule that explicitly, implicitly or even slightly hints that there is "any performance yardstick suited" for measuring thermal performance other than R-value. Don't be fooled. Air infiltration and thermal performance are two separate and distinct issues.

NAIMA
NORTH AMERICAN INSULATION
MANUFACTURERS ASSOCIATION

**STAY
TUNED!**

MYTH #6

Some types of insulation are better at air sealing than others

REALITY

All insulation needs proper air sealing.

Some spray-foam and cellulose insulation manufacturers claim that studies show their products are better at air sealing. The NAHB Research Center found the following studies to be flawed or limited either because they tested only a few houses, or did not provide equal air sealing to all insulation. Other studies found insignificant differences but are often misquoted. The studies found by NAHB RC to be limited, flawed or frequently misquoted include:

- Colorado study (unpublished)
- NAHB/EPA (2002)
- Christian (2005)
- Conservation Services Group (2004)
- Modern Materials (June 2006)
- Florida Solar Center (1994)
- CMHC (1998)
- National Research Canada (1998)

Building scientists and the Department of Energy and the Environmental Protection Agency agree, and the code mandates, that all insulation needs proper air sealing. Don't be fooled.

NAIMA
NORTH AMERICAN INSULATION
MANUFACTURERS ASSOCIATION

**STAY
TUNED!**