



# 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

**F**iber 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  $\geq 0.12$  W/cm<sup>2</sup> 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.

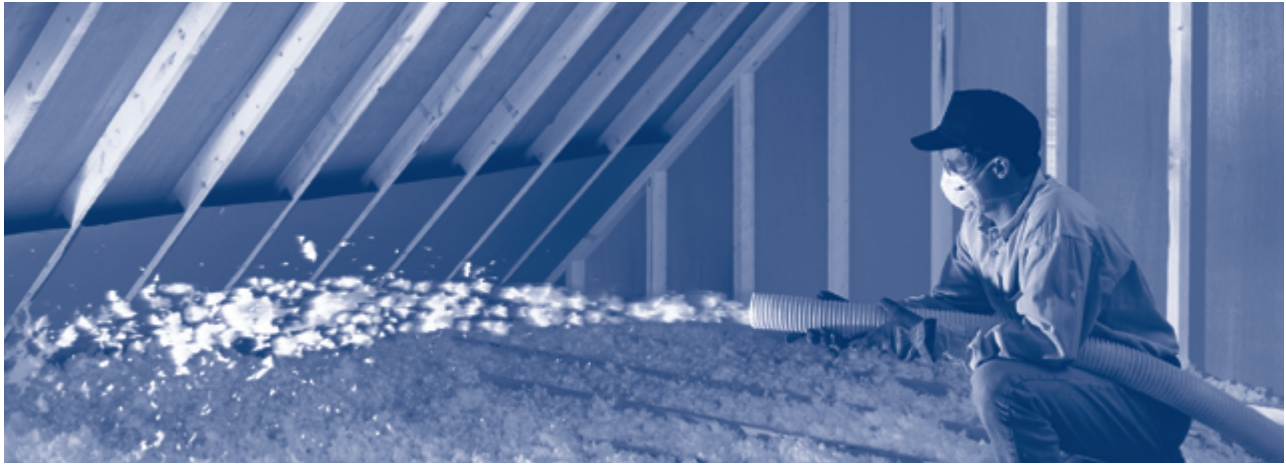
## Installed R-Value Of Attic Insulation

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 <sup>2</sup> _____	
To obtain an insulation resistance (R) of:	Minimum bags per 1000 ft <sup>2</sup> net area	Maximum ft <sup>2</sup> coverage per bag	Installed insulation should not be less than:	The weight per ft <sup>2</sup> of installed insulation should be not less than:
<b>Attic:</b>				
49	_____ bags / MSF	_____ feet <sup>2</sup>	_____ in. thick	_____ lb/ft <sup>2</sup>
38	_____ bags / MSF	_____ feet <sup>2</sup>	_____ in. thick	_____ lb/ft <sup>2</sup>
30	_____ bags / MSF	_____ feet <sup>2</sup>	_____ in. thick	_____ lb/ft <sup>2</sup>
22	_____ bags / MSF	_____ feet <sup>2</sup>	_____ in. thick	_____ lb/ft <sup>2</sup>
19	_____ bags / MSF	_____ feet <sup>2</sup>	_____ in. thick	_____ lb/ft <sup>2</sup>
13	_____ bags / MSF	_____ feet <sup>2</sup>	_____ in. thick	_____ lb/ft <sup>2</sup>
<b>Sidewalls: R-</b>	_____ bags / MSF	_____ feet <sup>2</sup>	_____ in. thick	_____ lb/ft <sup>2</sup>

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 used<sup>3</sup>. 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 information<sup>4</sup>
- This statement: "R means resistance to heat flow. The higher the R-value the greater the insulating power."<sup>2</sup>

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."<sup>4</sup>

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."<sup>5</sup>

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 application<sup>6</sup>

*\* 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](http://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:**

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800-569-4262

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

Knauf Insulation  
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