INSULATION CONTRACTORS ASSOCIATION OF AMERICA

Technical Bulletin

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No. 17: *Evaluation of Installed Loose-Fill Attic Insulation*

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SCOPE: Installing loose-fill insulation is a technically demanding job. The ICAA recognizes the need for a practical procedure to evaluate the installation of loose-fill products. The objective of this bulletin is to provide a step-by-step procedure to determine if an open-blow installation meets the manufacturer's bag label specification.

The procedure described can be used to estimate the average square foot weight of loose-fill insulation and the average thickness when only one type of insulation has been used. The accuracy of this procedure will depend on the skill of the person conducting the evaluation, the care taken in securing and measuring the samples, and the number and location of samples used for the evaluation.

It is important to remember that this is only an evaluation of the installation. The accuracy of the measurement procedure is approximately +/- 2 1/2% but the variability of the installed product may be +/- 15%.

EQUIPMENT REQUIRED: The following lists the equipment necessary to perform the evaluation:

- Sampling tool
- Scale
- Probe
- Steel rule
- Plastic bags
- Identification labels
- Knife
- Flashlight
- Gloves

Scale: Spring type scales are usually not accurate enough for this task. The most accurate type of scale would be a digital electronic balance. These balances are usually accurate to within +/- 2 grams or +/- 0.004 pounds.

Probe and rule: A satisfactory probe can be fabricated from 1/8 inch diameter welding rod. A probe 24 inches long and pointed on one end has proven to be effective. A steel rule graduated in either hundredths of an inch, sixty-fourths of an inch, or millimeters is satisfactory for measuring thickness.

Plastic bags: Larger, locking-lip type works well to hold sample or any medium size plastic bag with twist tie.

Identification labels: Adhered to or placed in bag to keep track of samples.

Sampling Tool: Construct a sheet metal coring cylinder at least 18 inches in length or longer than the thickest insulation to be sampled. A cylinder with a serrated edge will separate the material much easier when taking the insulation sample.

The cross sectional area of the sampling tool must be accurately determined. A 13.54 inch inside diameter cylinder equals one square foot area.

Note: Cross sectional area (sq. ft.) = .005454 x (cylinder diameter in inches)^2

COLLECTING LOOSE-FILL ATTIC SAMPLES

Initially, a visual inspection of the attic area is necessary to note the evenness of the loose-fill insulation and the uniformity of depth. There should be no low areas or voids in the insulation. A probe and measuring rule will be used to check the actual thickness of the insulation.

REMEMBER: Four points of caution must be exercised while making an attic inspection:

- Wear longsleeve, loose-fitting clothing, gloves, and eye protection when handling material. A disposable mask designed for nuisance type dust is advisable when high dust levels are encountered.

- Since moving about the attic is required, the inspector must be careful of his footing. Step only on the joists. Walking in the area between joists can result in falling through the ceiling drywall, causing injury to the inspector and damage to the house.

- The inspection procedure disturbs the integrity of the insulation, reducing its thermal effectiveness. Therefore, be sure to restore any disturbed insulation as close to its original condition as possible.

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• The inspection procedure disturbs the integrity of the insulation, reducing its thermal effectiveness. Therefore, be sure to restore any disturbed insulation to its original condition.

• Be careful to avoid body contact with protruding roof deck nails.

STEP-BY-STEP INSPECTION

It is important to take at least three samples or one sample for every 400 sq. ft. of insulated area, whichever is larger. Sampling within four feet of the access opening should be avoided. Samples must be representative of the entire attic area.

Step A. Select sample locations from between joists where the insulation is level and undisturbed.

Step B. Measure the thickness of insulation at each sample location using the probe and rule. The thickness for a selected sample should be the average of five thickness measurements made inside the envisioned coring area. Record and average the measurements.

Step C. Take a plug of the loose-fill insulation with the sample tool at the point where depth measurements were made. Work the cylinder of the tool into the insulation perpendicular to the loose-fill surface, rotating the tool back and forth so the serrated edge creates a circular sawing action. Work the cylinder all the way through the insulation until it meets the ceiling or backing material underneath.

WARNING: Care should be taken to check the area before rotating the sampling tool to make sure there is no wiring that could be damaged or cause electrical shock to the inspector.

Step D. Remove the insulation from within the cylinder and place it in the plastic bag.

Step E. Weigh the bag containing the sample. The weight of the bag must be subtracted from the total weight to obtain the weight of insulation. Divide the sample weight by the sq. ft. area of the coring cylinder to determine the sample sq. ft. weight. Record the sample sq. ft. weight with the average sample thickness determined in **Step B.**

Step F. Once the sample has been weighed, return the insulation to the place from which it was taken, making sure that the insulation is returned to its original condition as closely as possible.

EVALUATING THE RESULTS

You should have at least three sample measurements. Each sample measurement should provide: 1) the sample sq. ft. weight in pounds (sample weight of insulation divided by the sq. ft. area of the sampling tool); and 2) the sample average thickness (average of fine probe measurement).

Now average these values to get an attic average to make the comparison to the manufacturer's bag label specification.

Bag Label Specification - To evaluate the results, compare the attic average sample sq. ft. weight and attic average sample thickness with the loose-fill bag label minimums. If both minimum conditions are equaled or exceeded, the bag label R-value conditions have been met within the sampling accuracy previously stated.

The following tables are useful in carrying out the inspection procedure:

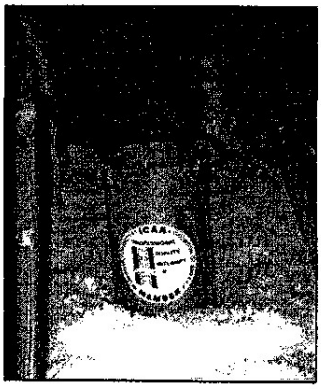
OUNCES/POUND CONVERSION

Oz.	Lb.	Oz.	Lb.
1.0	= 0.0625	11.0	= 0.6875
1.5	= 0.0938	11.5	= 0.7188
2.0	= 0.1250	12.0	= 0.7500
2.5	= 0.1563	12.5	= 0.7813
5.5	= 0.3438	15.5	= 0.9688
6.0	= 0.3750	16.0	= 1.0000
6.5	= 0.4063	16.5	= 1.0313
7.0	= 0.4375	17.0	= 1.0625
10.0	= 0.6250	20.0	= 1.2500
10.5	= 0.6563		

GRAMS/POUNDS CONVERSION

Oz.	Lb.	Oz.	Lb.
50g	= 0.110 lb.	350 g	= 0.770
100g	= 0.220 lb.	375g	= 0.825
125g	= 0.275 lb.	400g	= 0.880
150g	= 0.330 lb.	425g	= 0.935
300g	= 0.660 lb.	575g	= 1.265
325g	= 0.715 lb.	600g	- 1.320

What is "Cookie-Cutting?"



Cookie-cutting is recognized by the insulation industry as a reliable method of evaluating loose-fill insulation. A metal cylinder with serrated edge is used to collect insulation samples. Depth and weight measurements are obtained through the use of a ruler and a scale, and the actual R-value is calculated. Many independent firms offer the service to building inspection departments around the country.