



Home Innovation
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Summary Report
of Results for

NAIMA
11 Canal Center
Plaza, Suite 103,
Alexandria, VA 22314

**Aged Insulation
Evaluation**

February 23, 2017

Report 4162.032-
022317

Summary Report of Aged Insulation Evaluation

Prepared for

NAIMA
(North American Insulation Manufacturers Association)
Attention: Mr. Charles C. Cottrell
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Prepared by

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Executive Summary

The North American Insulation Manufacturers Association contracted with Home Innovation Research Labs to evaluate aged-performance of thermal insulation within exterior wall cavities of residential wood frame buildings. The study reports on 8 samples of fiber glass batt insulation that were taken from existing residential buildings that had been in service for at least 30 years.

In summary, the data show that the measured average R-value was 95.5% of the labeled R-value for the entire population of specimens that included R-7, R-9.6, R-11, and R-13 labeled R-value products. The range of the measured R-values was a high of 109% to a low of 75%.

The effect of aging on R-value performance cannot be inferred by the data in this study. The labeled R-value for the sampled batts provided the manufacturers' claimed performance; but the actual R-value at time of installation could not be determined or verified. The as-installed R-value could be greater than or lower than the labeled R-value.

The average duration-of-service was 40 years. Observations of the physical condition of the samples indicated that the batts were intact and functioning as designed. The samples exhibited physical integrity as observed by their ability to withstand removal from the walls, shipment to the testing laboratory, and handling during thermal testing. The samples retained their thickness and did not disintegrate when handled. The discoloration that was observed on the samples was not analyzed; but those areas appeared to be deposits from air filtration.

Background

The North American Insulation Manufacturers Association (NAIMA) contacted Home Innovation Research Labs concerning the life expectancy study of mineral fiber batts - exterior wall batt-type thermal insulation materials.

This study assessed the physical condition and thermal property of in situ wall batt-type thermal insulation, hereafter called insulation. The study reports on insulation that has been in service for at least 30 years. Home Innovation acquired eight samples from existing buildings. The batts selected had manufacturers' identification markings for its labeled thermal resistance (R-value). The insulation was documented as to their installed condition and removed for shipping to Home Innovation for testing to determine thermal resistance (R-value) as compared to the labeled R-value.

This report includes the following:

1. Protocol that describes the method(s) used to gather and document the samples. This sample gathering protocol could be used by other parties to collect samples in a similar manner in the event future testing is done. The protocol includes:
 - i. Photos of the materials before removal
 - ii. Guidance on removing the sample materials
 - iii. Guidance for storing and shipping the sample materials
 - iv. Dimensional measurements before and after removal from the wall
 - v. Minimum length and width for the sample materials
 - vi. Three stud-bay samples from each location (building)
2. Determine the density of the material
3. Determine the current thermal performance (R-value per ASTM C518)
4. Provide manufacturer's labeled R-value
5. Determine labeled vs. measured R-value as a percentage - (Measured R / Labeled R)
6. Provide a written description of the current condition of the materials
7. Recommendations for further testing (if applicable)

Sample Collecting Protocol

A sample collecting protocol was developed by Home Innovation. This protocol describes the method(s) used to gather and document the samples. The sample collecting protocol could be used by other parties to collect samples in a similar manner in the event future testing is done.

The sampling gathering protocol, as shown in Figures 1 and 2, includes:

- i. Photos of the materials before removal
- ii. Guidance on removing the sample materials
- iii. Guidance for storing and shipping the sample materials
- iv. Dimensional measurements before and after removal from the wall
- v. Minimum length and width for the sample materials
- vi. Three stud-bay samples from each location (building)



Life Expectancy of Mineral Fiber Batts Study

We need samples of fiberglass or rock wool batt insulation that have been in service as exterior wall insulation for 30 years or more. The purpose of the study is to document the long-term physical condition and thermal properties of batt insulation. A bounty of \$250 will be paid to each participant who provides a qualifying insulation sample with the requested documentation.

Here is what we need:

- **Samples must have the manufacturer's identification markings for R-value**
- **Fiberglass or rock wool batt samples from exterior walls ONLY**
- Samples must be from three different exterior wall cavities within the same house or building
- Samples must have been in normal service for 30 years or more and be undamaged
- Interior acoustical insulation does not qualify

Instructions:

1. Take a photo and measure each Batt before removing from the wall.
2. Measure dimension of batt in the wall cavity, record data in the table.
3. Carefully remove insulation from the wall starting with edges and getting behind the batt, not to make any damage to the material.
4. Lay the insulation on the floor and take measurements. Record the measurements on the datasheet.
5. Take another photo of each batt insulation.
6. Fold each batt insulation sample and place in a separate plastic bag.
7. Place the bags along with the original data sheet and photos in a shipping box. If you prefer, photos can be emailed to syuan@homeinnovation.com.

Please ship the insulation samples by June 15, 2016.

Shipping Address:

**Home Innovation Research Labs
450 Prince George's Blvd
Upper Marlboro, MD 20774
Attn: Sam Yuan**

Thank you for participating in this Batt insulation study. Your participation will make a difference.

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Revision Date: 5/18/16

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Figure 1 Sample Collection Protocol – Page 1



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Aged Insulation Batts Study Data Sheet

All corrections must be made with a **single strikethrough** and initialed

The year the building/house built or wall insulation installed, if remodeled: _____

Address of the house: _____

Specimen No. 1		
Specimen Type:	<input type="radio"/> Fiberglass <input type="radio"/> Rock wool (stone wool)	R- Value _____
	Before Removal	After Removal
Specimen Length (nearest 1/2 inch)		
Specimen Width (nearest 1/8 of an inch)		
Specimen Thickness (nearest 1/16 of an inch)		
Photo Taken	<input type="checkbox"/>	<input type="checkbox"/>

Specimen No. 2		
Specimen Type:	<input type="radio"/> Fiberglass <input type="radio"/> Rock wool (stone wool)	R- Value _____
	Before Removal	After Removal
Specimen Length (nearest 1/2 inch)		
Specimen Width (nearest 1/8 of an inch)		
Specimen Thickness (nearest 1/16 of an inch)		
Photo Taken	<input type="checkbox"/>	<input type="checkbox"/>

Specimen No. 3		
Specimen Type:	<input type="radio"/> Fiberglass <input type="radio"/> Rock wool (stone wool)	R- Value _____
	Before Removal	After Removal
Specimen Length (nearest 1/2 inch)		
Specimen Width (nearest 1/8 of an inch)		
Specimen Thickness (nearest 1/16 of an inch)		
Photo Taken	<input type="checkbox"/>	<input type="checkbox"/>

Comments: _____

Signature: _____ Date _____ Home Innovation Review: _____ Date _____
 Print Name: _____

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Figure 2
Sample Collection Protocol – Page 2

Collected Samples

Table 1 below shows the label R-value, type of insulation, location of the house where the insulation samples were removed and approximate year of service of the sample material.

Table 1
Collected Insulation Samples

No.	Label R-Value	Type of Insulation	Location of House	Age of Insulation
1	R11	Fiberglass	Troy, NY	31
2	R13	Fiberglass	Raleigh, NC	37
3	R7	Fiberglass	Missoula, MT	51
4	R11	Fiberglass	West Chicago, IL	43
5	R9.6	Fiberglass	Wayne, PA	54
6	R11	Fiberglass	Oakland, CA	38
7	R11	Fiberglass	Highlands Ranch, CO	34
8	R11	Fiberglass	Highlands Ranch, CO	34

Table 1 above shows the label R-value, type of insulation, location of the house where the insulation samples were removed and approximate duration of service (age) were noted for the sampled materials. Note that the photographs below were not corrected for color accuracy to the actual color of specimens.

SAMPLE NO. 1

Fiberglass Sample No. 1 has kraft paper facing as shown in Figure 3. The material is not damaged and clean section was cut for thermal testing.



Figure 3
Sample No. 1 – R11 Faced Fiberglass Insulation

SAMPLE NO. 2

Fiberglass Sample No. 2 has kraft paper facing, as shown in Figure 4. The material has small end sections damaged and clean section was cut for thermal testing.

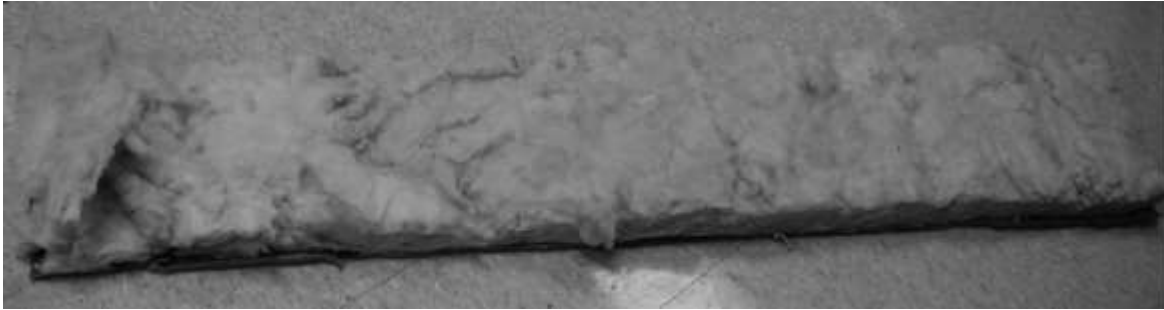


Figure 4
Sample No. 2 – R13 Faced Fiberglass Insulation

SAMPLE NO. 3

Fiberglass Sample No. 3 has kraft paper facing, as shown in Figure 5. The material has discoloration on the unfaced surface and clean section was cut for thermal testing.



Figure 5
Sample No. 3 – R7 Faced Fiberglass Insulation

Sample No. 4

Fiberglass Sample No. 4 has kraft paper facing, as shown in Figure 6. The material has discoloration around edges on the unfaced surface, but no damage was found.

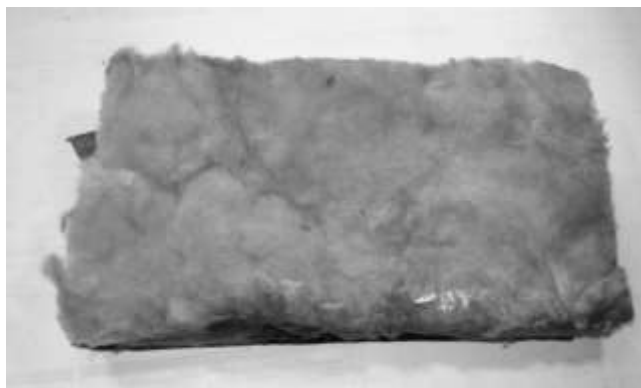


Figure 6
Sample No. 4 – R11 Faced Fiberglass Insulation

SAMPLE NO. 5

Fiberglass Sample No. 5 has kraft paper facing, as shown in Figure 7. The material has slight discoloration around edges on the unfaced surface, but no damage was found.



Figure 7
Sample No. 5 – R9.6 Faced Fiberglass Insulation

SAMPLE NO. 6

Fiberglass Sample No. 6 has kraft paper facing, as shown in Figure 8. The material has slight discoloration and tear. Specimens were taken from undamaged sections of the materials.

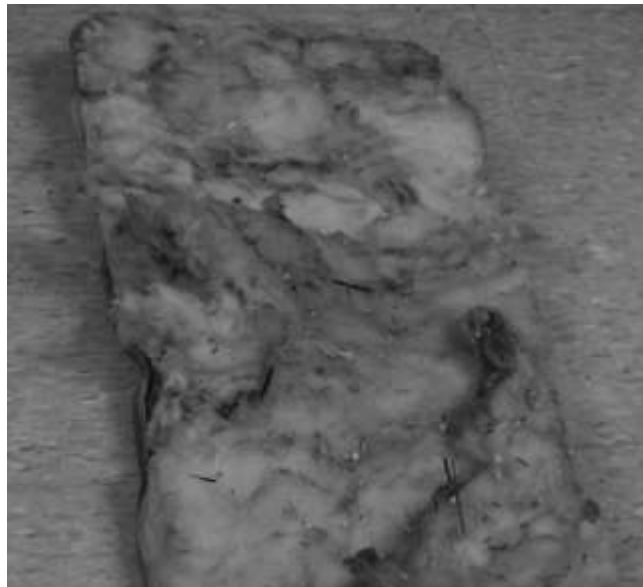


Figure 8
Sample No. 6 – R11 Faced Fiberglass Insulation

SAMPLE NO. 7

Fiberglass Sample No. 7 has kraft paper facing, as shown in Figure 9. The material has slight discoloration around the edge of unfaced material, but no damage was found.

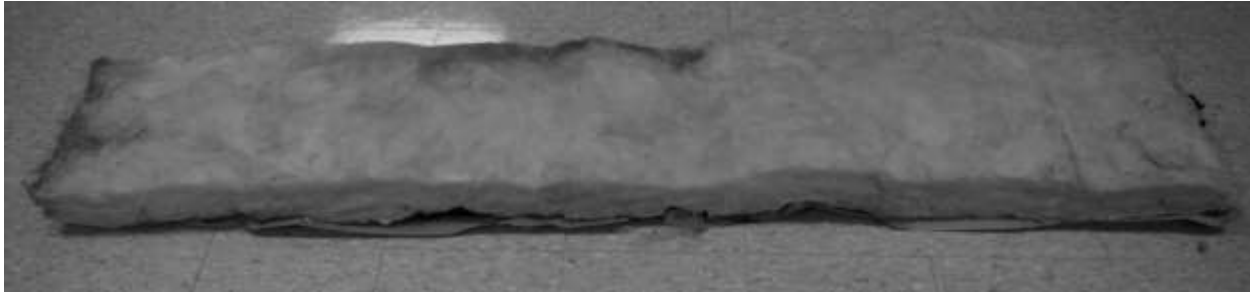


Figure 9
Sample No. 7 – R11 Faced Fiberglass Insulation

SAMPLE NO. 8

Fiberglass Sample No. 8 has kraft paper facing, as shown in Figure 10. The material has discoloration of the unfaced material, but no damage was found.

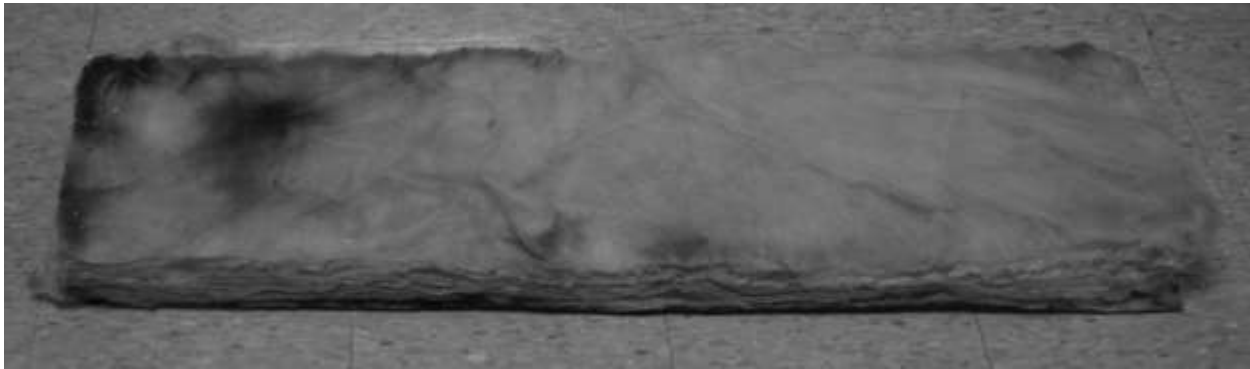


Figure 10
Sample No. 8 – R11 Faced Fiberglass Insulation

Thermal Results of Collected Samples

Table 2 below lists the label R-value, type of insulation, average density of test specimen, average tested R-value, percentage of measured R-value / label R-value for each selected sample material.

Table 2
Thermal Test Results of Collected Insulation Samples

No.	Label R-Value	Type of Insulation	Average Density (pcf)	Average Tested R-Value	Measured R/ Label R (%)
1	11	Fiberglass	0.53	10.1	92%
2	13	Fiberglass	0.83	12.3	94%
3	7	Fiberglass	0.42	7.1	102%
4	11	Fiberglass	0.67	8.2	75%
5	9.6	Fiberglass	0.56	8.6	90%
6	11	Fiberglass	0.72	11.6	105%
7	11	Fiberglass	0.44	12.0	109%
8	11	Fiberglass	0.62	10.7	97%

Declarations & Disclaimers

This is a factual report of the results obtained from laboratory tests of the samples provided and installed by an independent insulation contractor. The report may be reproduced and distributed at the client's discretion provided it is reproduced in its entirety. Any partial reproduction must receive prior written permission of the Home Innovation Research Labs.

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This test report does not constitute a product endorsement by Home Innovation Research Labs or any of its accrediting agencies.

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