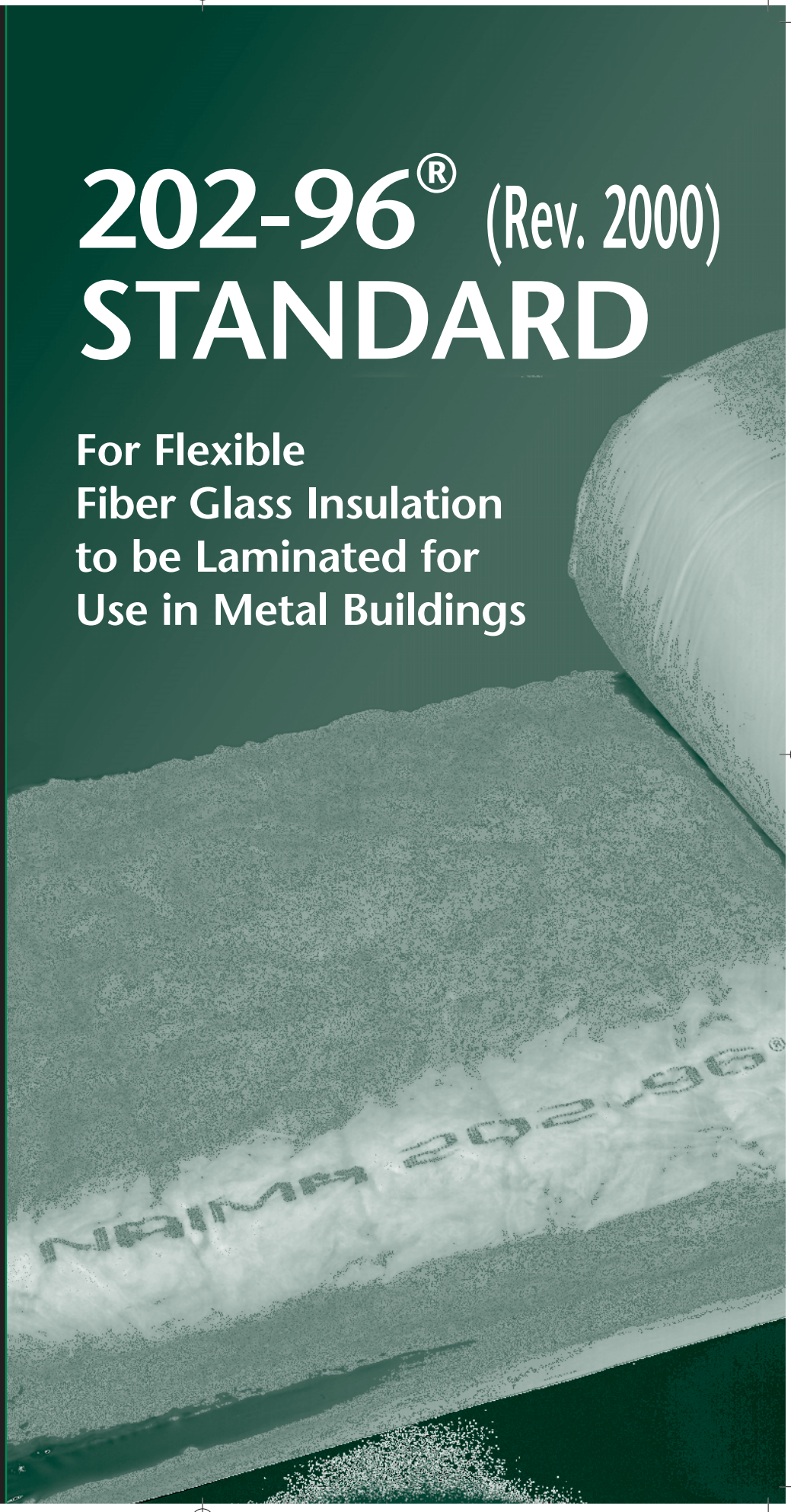
NAIMA
North American Insulation Manufacturers Association

202-96® (Rev. 2000) STANDARD

For Flexible Fiber Glass Insulation to be Laminated for Use in Metal Buildings



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NAIMA 202-96® STANDARD (Rev. 2000)

For Flexible Fiber Glass Insulation to be Laminated for Use in Metal Buildings

PURPOSE:

A standard product specification for manufacturers, designers, and users of Metal Building Insulation Systems.

1.0 Scope

1.1 This specification covers the classification, composition, and the physical properties of flexible fiber glass insulation designed to be further processed (laminated), and intended for use in the walls and roofs of manufactured metal buildings.

1.2 The insulation is further designed to provide the capability of obtaining thermal resistance (R-values) after processing to be equivalent to those nominal values printed on the product as specified in paragraph 6.1.

1.3 For Insulation to be certified for R-value after lamination use the NIA Certified Faced Insulation Standard.

1.4 The R-values in this specification are for the insulation only and do not include the effects of facings, air film surface resistances, compression of insulation at the framing members of the building, conductance through metal fasteners and other parallel heat transfer paths due to design or installation techniques.

2.0 Applicable Documents

2.1 ASTM Standards

C167 Test Methods for Thickness and Density of Blanket or Batt Thermal Insulations

C168 Terminology Relating to Thermal Insulation

C177 Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus

C390 Practice for Sampling and Acceptance of Thermal Insulation Lots

C653 Guide for Determination of the Thermal Resistance of Low-Density Blanket-Type Mineral Fiber Insulation

C665 Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing

C991 Specification for Flexible Fibrous Glass Insulation for Metal Buildings

C1104 Test Method for Determining the Water Vapor Sorption of Unfaced Mineral Fiber Insulation

C1304 Test Method for Assessing the Odor Emission of Thermal Insulation Materials

C1338 Test Method for Determining Fungi Resistance of Insulation Materials and Facings

E84 Standard Test Method for Surface Burning Characteristics of Building Materials

2.2 Other Standards

NIA Certified Faced Insulation Standard: Thermal Standard For Flexible Faced Insulation Used in Metal Buildings.

3.0 Classification

3.1 The flexible insulation is furnished as glass processed from the molten state into fibrous form, bonded with a thermosetting resin and formed into a resilient flexible blanket.

4.0 Terminology

4.1 Definitions of terms relating to insulation, ASTM C168, shall be considered as applying to the terms in this standard.

5.0 Ordering Information

5.1 Material shall be ordered by specifying thermal resistance (R-value), length and width.

6.0 Physical Requirements

6.1 The thermal resistance of the insulation at 75°F (24°C) mean temperature shall be determined in accordance with ASTM C653. Use thermal conductivity tests per ASTM C177 or C518 with a temperature differential of 40 to 50°F (4 to 10°C), thickness recoveries determined in accordance with paragraph 9.3 and densities determined in accordance with paragraph 9.4.

Note: Below is a list of the most common nominal R-value products available.

R-10 °F·ft²·h/Btu (1.8 °K/W·m)
R-11 °F·ft²·h/Btu (1.9 °K/W·m)
R-13 °F·ft²·h/Btu (2.3 °K/W·m)
R-16 °F·ft²·h/Btu (2.8 °K/W·m)
R-19 °F·ft²·h/Btu (3.3 °K/W·m)
R-25 °F·ft²·h/Btu (4.4 °K/W·m)
R-30 °F·ft²·h/Btu (5.3 °K/W·m)

6.1.1 Thermal Resistance Tolerance – The R-value, determined from the average of a three roll sample, shall not be less than 103% of the nominal R-value for each inspection. Also, the running average of the most recent four quarterly inspection periods shall equal or exceed the requirements in Table 1:

Table 1: Minimum R-value Tolerance Table

Inspection Number (Three rolls per inspection)	Minimum Percentage of Nominal R-value	Minimum R-value, nominal						
		R-10	R-11	R-13	R-16	R-19	R-25	R-30
1	103.0	10.30	11.33	13.39	16.48	19.57	25.75	30.90
2	104.6	10.46	11.51	13.60	16.74	19.88	26.15	31.38
3	105.3	10.53	11.58	13.69	16.85	20.01	26.33	31.59
4	105.7	10.57	11.63	13.74	16.91	20.08	26.43	31.71
∞	108.4	10.84	11.92	14.09	17.34	20.60	27.10	32.52

NAIMA 202-96® (Rev. 2000) Certified Fiber Glass Metal Building Insulations are designed to be laminated and are intended for use in the walls and roofs of manufactured buildings.

NAIMA 202-*96*® (Rev. 2000) Certified Fiber Glass Metal Building Insulations minimize heat loss or heat gain, control condensation and provide acoustical integrity in metal buildings.

6.2 Surface Burning Characteristics – The surface burning characteristics shall be determined in accordance with ASTM E84.

This standard should be used to measure and describe the properties of materials, products, or assemblies in response to heat and flame under controlled laboratory conditions and should not be used to describe or appraise the fire hazard or fire risk of materials, products, or assemblies under actual fire conditions. However, results of this test may be used as elements of a fire risk assessment, which takes into account all of the factors, which are pertinent to an assessment of the fire hazard of a particular end use.

6.2.1 The classification shall be no greater than:

Flame Spread Index: 25

Smoke Developed Index: 50

Values are for unfaced insulation. To ensure compliance with the building code, the insulation must be tested with the appropriate facing and adhesive.

6.3 Water Vapor Sorption – The water vapor sorption shall not be greater than 5% by weight when determined in accordance with the procedure set forth in ASTM C1104.

6.4 Corrosiveness – When tested in accordance with the procedure in ASTM C665, using steel test plates, the insulation shall show no greater corrosion than the washed and dried sterile cotton control.

6.5 Fungi Resistance – When tested in accordance with the procedure in ASTM C1338, the insulation shall have no growth greater than that observed on the comparative control item.

6.6 Odor Emission – When tested in accordance with the procedure in ASTM C1304, the insulation shall not emit an objectionable odor as determined by three or more of the five panel members.

6.7 Dimensional Tolerances – The average measured length and width shall not differ from the manufacturer's standard dimensions, when determined in accordance with paragraph 9.1, by more than the following:

Length - 0 inches (0 mm)

Width ± 1/4 inch (6 mm)

7.0 Workmanship

7.1 The material shall indicate good workmanship and shall not have visible defects which adversely affect its serviceability.

8.0 Sampling and Inspection

8.1 Unless otherwise agreed, the manufacturer's normal sampling and inspection procedures shall be acceptable, or as outlined in Section No. 4 of ASTM C390.

9.0 Test Methods – Dimensional Properties

9.1 Roll Weight

9.1.1 Test Procedure – Using a scale, weigh the blanket insulation as received in packaged roll form. Remove and weigh the roll packaging materials.

9.1.2 Calculation and Report – Calculate and record insulation roll net weight by subtracting packaging material weight from packaged roll weight.

9.2 Length and Width

9.2.1 Test Procedure – Unroll the weighed roll of insulation from paragraph 9.1 on a flat, smooth, hard surface. Using a steel measuring tape, measure the entire insulation blanket length and width in several locations. An alternate method may be used where the flat surface has been previously ruled out to facilitate ease of measurement.

9.2.2 Calculation and Report – Calculate the average insulation blanket length and width dimensions and record the values.

9.3 Thickness

9.3.1 Test Procedure – Use at least 35 feet (10.7 m) in length of the unrolled and measured roll of insulation from paragraph 9.2. When roll lengths are in excess of 70 feet (21.3 m), it is permissible to cut the roll into two equal lengths for ease of handling. The test roll is then flipped over for its entire length. Finally, after grasping one end, the material is pulled back over itself until the original surface is again facing up. Ten thickness measurements are then taken, using a pin and disc gauge per ASTM C167 on each end of the roll starting 10 feet (3 m) in from the roll ends. The ten thickness checks should be spaced uniformly over the next 15 feet (4.5 m), sampling the full width but not closer than 1/10 of the width from edges.

9.3.2 Calculation and Report – Calculate and record the average of the twenty thickness recovery checks. The lesser of either the average thickness recovery value or the stated thickness shall be used to calculate the thermal resistance in 6.1 providing the thermal conductivity of the material is known or has been provided by the manufacturer.

9.4 Density

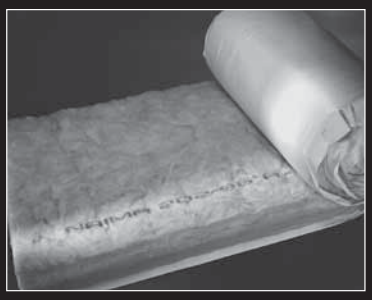
9.4.1 Test Procedure – Obtain the roll length and width from paragraph 9.2, the thickness as determined in paragraph 9.3, and the net roll weight from paragraph 9.1.

9.4.2 Calculation and Report – Calculate and record the density from the following equation.

$$\text{Density (lb/ft}^3\text{)} = \frac{\text{Roll Weight (lb.)} \times 144}{\text{Length (ft.)} \times \text{Width (in.)} \times \text{Thickness (in.)}}$$

$$\text{Density (kg/m}^3\text{)} = \frac{\text{Roll Weight (kg)} \times 10^6}{\text{Length (m)} \times \text{Width (mm)} \times \text{Thickness (mm)}}$$

NAIMA 202-96® (Rev. 2000) Certified Fiber Glass Metal Building Insulation is produced in a special manufacturing process to give it the structural integrity it needs to recover thickness after lamination, shipping and installation.



NAIMA 202-96® (Rev. 2000) Certified Fiber Glass Metal Building Insulations are clearly identified with the manufacturer's name, NAIMA 202-96 (Rev. 2000) and the "R" value printed on the insulation.

10.0 Inspection

10.1 Inspection of the material shall be agreed upon by the purchaser and the supplier as part of the purchase contract.

11.0 Rejection

11.1 If inspection of the sample shows failure to conform to the thermal and dimensional property requirements of this Standard, a second sample from the same lot shall be tested and the results of this retest averaged with the results of the original test.

11.2 Upon retest as described in 11.1, failure to conform to this Standard shall constitute grounds for rejection.

11.3 In case of rejection, the manufacturer or seller shall have the right to inspect the rejected shipment or resubmit the lot after removal of that portion of the shipment not conforming to the specified requirements.

12.0 Product Thermal Certification

12.1 Samples of this product shall be tested quarterly by a nationally recognized independent laboratory, and determined to meet the stated requirements of the NAIMA 202-96® (Rev. 2000) Standard. Manufacturer represents that their product has been produced to the same standard as samples tested.

13.0 Marking

13.1 Standard sizes of fiber glass insulations are listed by their thermal resistance (R-value) as shown in paragraph 6.1 with the following permanent marking identified on the insulation in a repetitive or continuous manner:

Manufacturer and/or Product Name
NAIMA 202-96® (Rev. 2000)
Symbol "R" for registered (®)
The appropriate R-value

The use of the NAIMA 202-96® (Rev. 2000) is restricted to NAIMA Metal Building Committee members.

14.0 Packaging

14.1 Unless otherwise specified, the package shall be marked with the seller's name and designation, length, width, nominal thickness, R-value, total number of square feet, manufacturing date code, and surface burning characteristics.

14.2 Unless otherwise agreed or specified between the purchaser and the manufacturer or seller, the insulation shall be packed in the manufacturer's standard commercial container.

15.0 Storage

15.1 The material shall be stored in such a manner as to protect the package from direct sunlight, weather, and temperature extremes.

15.2 Shelf life shall be agreed upon between the seller and the purchaser.

Appendix

Recommended Lamination Practices

X1.0 Lamination and Thickness Recovery*

X1.1 Control adhesive application rates to minimize the accumulation of excess moisture within the insulation.

X1.2 Minimize nip roller pressure to reduce compression of the insulation during lamination.

X1.3 Control compression of the insulation during windup after lamination. Excessive compression in the package will have a detrimental effect on thickness recovery. The compression ratio should be less than 5.5:1. For optimal thickness recovery, use compression ratios of 5.0:1 or less.

X1.3.1 Compression ratio is calculated by

$$\text{Compression Ratio} = \frac{\text{Pre-laminated Thickness (in.)}^{**} \times \text{Roll Length (ft.)} \times 150.8}{\text{circumference (in.)} \times \text{circumference (in.)}}$$

$$\text{Compression Ratio} = \frac{\text{Pre-laminated Thickness (mm)}^{**} \times \text{Roll Length (m)} \times 12566}{\text{circumference (mm)} \times \text{circumference (mm)}}$$

X1.4 Package ends should be pierced, about one square inch (650 mm^2) per end, to provide a ventilation path to allow the moisture in the package to escape as the adhesive cures.

X1.5 Packages of faced insulation should be stacked on their sides to allow cross ventilation and the removal of water through evaporation.

X1.6 Minimize storage time in the package after lamination. Excessive storage time will adversely affect the thickness recovery. A maximum of seven days storage is recommended. The stack height of stored material should not be so high that the rolls on bottom layers are crushed by the weight of the product above them.

* See NAIMA's Insulation Facts #28, *Facts About Lamination Process Control And Thickness Recovery After Lamination* (Pub. No. MB308) for more information on the lamination process.

** Thickness refers to the prelamination thickness printed on the bag label.

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.

NAIMA, continuing its members' commitment to safety has established a renewed Product Stewardship Program, which embodies the components of the earlier OSHA-NAIMA Health and Safety Partnership Program (HSPP). The HSPP was a comprehensive eight-year partnership with OSHA, which NAIMA completed in May 2007, and now NAIMA incorporates these safe work practices into NAIMA's Product Stewardship Program.

NAIMA 202-96® (Rev. 2000) Certified Fiber Glass Metal Building Insulations are distributed nationwide by qualified independent laminators who are experienced in providing NAIMA 202-96 (Rev. 2000) Certified Insulations with attractive, light reflective vapor retarder facings in widths and lengths that fit most any metal buildings.

For more information contact:

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

NAIMA
Metal Building Committee Members
that Supply 202-96 Insulation

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

Johns Manville
P.O. Box 5108
Denver, CO 80217
800-654-3103

Knauf Insulation
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