SECTION 07210

RIGID BOARD INSULATION

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PART 1 GENERAL

1.1 SECTION INCLUDES

A. Polyisocyanurate insulation for roofing applications.

1.2 RELATED SECTIONS

A. Section 07260 - Vapor Retarders: Vapor retarder materials adjacent to insulation.

B. Section 07270 - Air Barriers: Air seal materials adjacent to insulation.

C. Section 07500 - Membrane Roofing: Roofing materials adjacent to insulation.

1.3 REFERENCES

A. ASTM C209 - Standard Test Methods for Cellulosic Fiber Insulating Board.

B. ASTM D1621 - Standard Test Method for Compressive Properties of Rigid Cellular Plastics.

C. ASTM D1622 - Standard Test Method for Apparent Density of Rigid Cellular Plastics.

D. ASTM D2126 - Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging.

E. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials.

F. ASTM E 72 - Standard Test Methods of Conducting Strength Tests of Panels for Building Construction.

G. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

H. ASTM E 96 - Standard Test Methods for Water Vapor Transmission of Materials.

I. ASTM E 331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.

J. ASTM E 564 - Standard Practice for Static Load Test for Shear Resistance of Framed Walls for Buildings.

K. ASTM E 2126 - Standard Test Methods for Cyclic (Reversed) Load Test for Shear Resistance of Vertical Elements of the Lateral Force Resisting Systems for Buildings.

L. ASTM E 2357 - Standard Test Method for Determining Air Leakage of Air Barrier Assemblies.

M. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components.

N. SBCRI Single Element Lateral Load Testing.

O. UL 1715 - Fire Test of Interior Finish Material.

1.4 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
1. Preparation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Installation methods.

C. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

D. Verification Samples: For each finish product specified, two samples, minimum size 4 inches by 6 inches (102mm x 150 mm).

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: All primary products specified in this section will be supplied by a single manufacturer with a minimum of ten (10) years experience.

B. Installer Qualifications: All products listed in this section are to be installed by a single installer with a minimum of five (5) years demonstrated experience in installing products of the same type and scope as specified.

C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
1. Finish areas designated by Architect.
2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
3. Refinish mock-up area as required to produce acceptable work.

D. Pre-installation Meeting: Conduct pre-installation meeting to verify project requirements, foundation/structural system/substrate conditions, and insulation manufacturer's installation instructions.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store products per manufacturer's instructions until ready for installation.

B. Store and dispose of hazardous materials, and materials contaminated by hazardous materials, in accordance with requirements of local authorities having jurisdiction.

1.7 SEQUENCING

A. Ensure that locating templates and other information required for installation of products of this section are furnished to affected trades in time to prevent interruption of construction progress.

B. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.8 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.9 WARRANTY

A. At project closeout, provide to Owner or Owners Representative an executed copy of the manufacturer's standard limited warranty against manufacturing defect, outlining its terms, conditions, and exclusions from coverage.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Rmax Operating, LLC, which is located at: 13524 Welch Rd. ; Dallas, TX 75244-5227; Toll Free Tel: 800-527-0890; Tel: 972-387-4500; Fax: 972-387-4673; Email: request info (rmax@rmax.com); Web: www.rmax.com
   1. Rmax Operating, LLC; 13524 Welch Rd., Dallas, TX 75244. Toll Free Tel: 800-527-0890. Tel: 972-387-4500. Fax: 972-387-4673. Email: specs@rmax.com. Web: www.rmax.com .
   2. Rmax Operating, LLC; 210 Lyon Dr., Fernley, NV 89408. Toll Free Tel: 800-762-9462. Tel: 775-575-4849. Fax: 775-575-5035. Email: specs@rmax.com. Web: www.rmax.com .
   3. Rmax Operating, LLC; 1649 S. Batesville Rd., Greer, SC 29650. Toll Free Tel: 800-845-4455. Tel: 864-297-1382. Fax: 864-234-7548. Email: specs@rmax.com. Web: www.rmax.com .

B. Substitutions: Not permitted.

C. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 ROOF INSULATION

A. Multi-Max FA-3: Closed-cell polyisocyanurate roof insulation with glass fiber / organic mat facer on each side.
   1. Density (Nominal) in accordance with ASTM D1622: 2.0 pcf.
   2. Compressive Strength in accordance with ASTM D1621: 20 psi.
   3. Flame Spread in accordance with ASTM E84: 25 to 60.
   4. Smoke Developed in accordance with ÅSTM E84: 75 to 160.
   5. Water Vapor Transmission in accordance with ÅSTM E96: Less than 1.5

perms.

6. Water Absorption in accordance with ÅSTM C209: Less than 1 percent by volume.
7. Dimensional Stability in accordance with ASTM D2126: Less than 2 percent linear change.
8. Class 1 roof insulation per FM Standard 4450.
9. Class A for external flame per UL Standard 790.
10. Class A for internal flame per UL Standard 1256.
11. Fire rated roof/ceiling assemblies per UL Standard 263.
12. Thickness: 1.5 inches (38mm).
    a. Long Term Thermal Resistance (LTTR): 9.0.
13. Thickness: 2.0 inches (51mm).
    a. Long Term Thermal Resistance (LTTR): 12.1.
14. Thickness: 2.5 inches (64mm).
    a. Long Term Thermal Resistance (LTTR): 15.3.
15. Thickness: 3.0 inches (76mm).
    a. Long Term Thermal Resistance (LTTR): 18.5.
16. Thickness: 3.5 inches (89mm).
    a. Long Term Thermal Resistance (LTTR): 21.7.
17. Thickness: 4.0 inches (102mm).
    a. Long Term Thermal Resistance (LTTR): 25.0.

B. Tapered Thermaroof-3: Closed-cell polyisocyanurate roof insulation with glass fiber / organic mat facer on each side.

1. Density (Nominal) in accordance with ÅSTM D1622: 2.0 pcf.
2. Compressive Strength in accordance with ÅSTM D1621: 20 psi.
3. Flame Spread in accordance with ÅSTM E84: 25 to 60.
4. Smoke Developed in accordance with ÅSTM E84: 75 to 160.
5. Water Vapor Transmission in accordance with ASTM E96: Less than 1.5 perms.
6. Water Absorption in accordance with ASTM C209: Less than 1 percent by volume.
7. Dimensional Stability in accordance with ASTM D2126: Less than 2 percent linear change.
8. Class 1 roof insulation per FM Standard 4450.
9. Class A for external flame per UL Standard 790.
10. Class A for internal flame per UL Standard 1256.
11. Fire rated roof/ceiling assemblies per UL Standard 263.
12. Slope: 1/8". Average Thickness: 1.75 inches (44mm).
    a. Long Term Thermal Resistance (LTTR): 10.6.
13. Slope: 1/8". Average Thickness: 2.25 inches (57mm).
    a. Long Term Thermal Resistance (LTTR): 13.7.
14. Slope: 1/8". Average Thickness: 2.75 inches (70mm).
    a. Long Term Thermal Resistance (LTTR): 16.9.
15. Slope: 1/8". Average Thickness: 3.25 inches (83mm).
    a. Long Term Thermal Resistance (LTTR): 20.1.
16. Slope: 1/8". Average Thickness: 3.75 inches (95mm).
    a. Long Term Thermal Resistance (LTTR): 23.4.
17. Slope: 1/4". Average Thickness: 1.50 inches (38mm).
    a. Long Term Thermal Resistance (LTTR): 9.0.
18. Slope: 1/4". Average Thickness: 2.0 inches (51mm).
    a. Long Term Thermal Resistance (LTTR): 12.1.
19. Slope: 1/4". Average Thickness: 2.50 inches (64mm).
    a. Long Term Thermal Resistance (LTTR): 15.3.
20. Slope: 1/4". Average Thickness: 3.00 inches (76mm).
    a. Long Term Thermal Resistance (LTTR): 18.5.

21. Slope: 1/4". Average Thickness: 3.5 inches (89mm).
    a. Long Term Thermal Resistance (LTTR): 21.7.

C. Ultra-Max: Closed-cell polyisocyanurate roof insulation with an inorganic polymer coated glass fiber mat facer on each side.
1. Density (Nominal) in accordance with ÅSTM D1622: 2.0 pcf.
2. Compressive Strength in accordance with ÅSTM D1621: 20 psi.
3. Flame Spread in accordance with ÅSTM E84: 25 to 60.
4. Smoke Developed in accordance with ÅSTM E84: 75 to 160.
5. Water Vapor Transmission in accordance with ÅSTM E96: Less than 1.5 perms.
6. Water Absorption in accordance with ÅSTM C209: Less than 1 percent by volume.
7. Dimensional Stability in accordance with ÅSTM D2126: Less than 2 percent linear change.
8. Class 1 roof insulation per FM Standard 4450.
9. Class A for external flame per UL Standard 790.
10. Class A for internal flame per UL Standard 1256.
11. Fire rated roof/ceiling assemblies per UL Standard 263.
12. Thickness: 1.5 inches (38mm).
    a. Long Term Thermal Resistance (LTTR): 9.0.
13. Thickness: 2.0 inches (51mm).
    a. Long Term Thermal Resistance (LTTR): 12.1.
14. Thickness: 2.5 inches (64mm).
    a. Long Term Thermal Resistance (LTTR): 15.3.
15. Thickness: 3.0 inches (76mm).
    a. Long Term Thermal Resistance (LTTR): 18.5.
16. Thickness: 3.5 inches (89mm).
    a. Long Term Thermal Resistance (LTTR): 21.7.
17. Thickness: 4.0 inches (102mm).
    a. Long Term Thermal Resistance (LTTR): 25.0.

D. Tapered Ultra-Max: Closed-cell polyisocyanurate roof insulation with an inorganic polymer coated glass fiber mat facer on each side.
1. Density (Nominal) in accordance with ÅSTM D1622: 2.0 pcf.
2. Compressive Strength in accordance with ASTM D1621: 20 psi.
3. Flame Spread in accordance with ÅSTM E84: 25 to 60.
4. Smoke Developed in accordance with ÅSTM E84: 75 to 160.
5. Water Vapor Transmission in accordance with ÅSTM E96: Less than 1.5 perms.
6. Water Absorption in accordance with ÅSTM C209: Less than 1 percent by volume.
7. Dimensional Stability in accordance with ASTM D2126: Less than 2 percent linear change.
8. Class 1 roof insulation per FM Standard 4450.
9. Class A for external flame per UL Standard 790.
10. Class A for internal flame per UL Standard 1256.
11. Fire rated roof/ceiling assemblies per UL Standard 263.
12. Slope: 1/8". Average Thickness: 1.75 inches (44mm).
    a. Long Term Thermal Resistance (LTTR): 10.6.
13. Slope: 1/8". Average Thickness: 2.25 inches (57mm).
    a. Long Term Thermal Resistance (LTTR): 13.7.
14. Slope: 1/8". Average Thickness: 2.75 inches (70mm).
    a. Long Term Thermal Resistance (LTTR): 16.9.
15. Slope: 1/8". Average Thickness: 3.25 inches (83mm).
    a. Long Term Thermal Resistance (LTTR): 20.1.

16. Slope: 1/8". Average Thickness: 3.75 inches (95mm).
    a. Long Term Thermal Resistance (LTTR): 23.4.
17. Slope: 1/4". Average Thickness: 1.50 inches (38mm).
    a. Long Term Thermal Resistance (LTTR): 9.0.
18. Slope: 1/4". Average Thickness: 2.0 inches (51mm).
    a. Long Term Thermal Resistance (LTTR): 12.1.
19. Slope: 1/4". Average Thickness: 2.50 inches (64mm).
    a. Long Term Thermal Resistance (LTTR): 15.3.
20. Slope: 1/4". Average Thickness: 3.00 inches (76mm).
    a. Long Term Thermal Resistance (LTTR): 18.5.
21. Slope: 1/4". Average Thickness: 3.5 inches (89mm).
    a. Long Term Thermal Resistance (LTTR): 21.7.

E. Re-Cover Board-3: Closed-cell polyisocyanurate roof insulation with either glass fiber / organic mat facer on each side or inorganic polymer coated glass fiber mat facer on each side.
1. Density (Nominal) in accordance with ASTM D1622: 2.0 pcf.
2. Compressive Strength in accordance with ÅSTM D1621: 20 psi.
3. Flame Spread in accordance with ASTM E84: 25 to 60.
4. Smoke Developed in accordance with ASTM E84: 75 to 160.
5. Water Vapor Transmission in accordance with ÅSTM E96: Less than 1.5 perms.
6. Water Absorption in accordance with ÅSTM C209: Less than 1 percent by volume.
7. Dimensional Stability in accordance with ASTM D2126: Less than 2 percent linear change.
8. Thickness: 1.0 inches (25mm).
    a. Long Term Thermal Resistance (LTTR): 6.0.
9. Thickness: 1.1 inches (28mm).
    a. Long Term Thermal Resistance (LTTR): 6.6.
10. Thickness: 1.2 inches (30mm).
    a. Long Term Thermal Resistance (LTTR): 7.2.
11. Thickness: 1.25 inches (32mm).
    a. Long Term Thermal Resistance (LTTR): 7.5.
12. Thickness: 1.3 inches (33mm).
    a. Long Term Thermal Resistance (LTTR): 7.8.
13. Thickness: 1.4 inches (36mm).
    a. Long Term Thermal Resistance (LTTR): 8.4.

F. Nailable Base-3: Composite product composed of a closed-cell polyisocyanurate roof insulation with glass fiber / organic mat facer on one side and a nailing panel on the top surface, such 7/16" or 5/8" OSB or CDX plywood (APA rated). Following physical properties are for the insulation component only.
1. Density (Nominal) in accordance with ÅSTM D1622: 2.0 pcf.
2. Compressive Strength in accordance with ÅSTM D1621: 20 psi.
3. Flame Spread in accordance with ÅSTM E84: 25 to 60.
4. Smoke Developed in accordance with ÅSTM E84: 75 to 160.
5. Water Vapor Transmission in accordance with ÅSTM E96: Less than 1.5 perms.
6. Water Absorption in accordance with ASTM C209: Less than 1 percent by volume.
7. Dimensional Stability in accordance with ÅSTM D2126: Less than 2 percent linear change.
8. Class 1 roof insulation per FM Standard 4450 (2" minimum thickness).
9. Thickness: 1.5 inches (38mm).
    a. Long Term Thermal Resistance (LTTR): 6.7.

10. Thickness: 2.1 inches (53mm).
    a. Long Term Thermal Resistance (LTTR): 10.3.
11. Thickness: 2.5 inches (64mm).
    a. Long Term Thermal Resistance (LTTR): 12.8.
12. Thickness: 3.0 inches (76mm).
    a. Long Term Thermal Resistance (LTTR): 16.0.
13. Thickness: 3.5 inches (89mm).
    a. Long Term Thermal Resistance (LTTR): 19.2.
14. Thickness: 3.7 inches (94mm).
    a. Long Term Thermal Resistance (LTTR): 20.5.
15. Thickness: 3.8 inches (97mm).
    a. Long Term Thermal Resistance (LTTR): 21.1.
16. Thickness: 4.0 inches (102mm).
    a. Long Term Thermal Resistance (LTTR): 22.4.
17. Thickness: 4.5 inches (114mm).
    a. Long Term Thermal Resistance (LTTR): 25.7.

G. Vented Nailable Base-3: Composite product composed of a closed-cell polyisocyanurate roof insulation with glass fiber / organic mat facer on each side, furring strips and a nailing panel on the top surface, such 7/16" or 5/8" OSB or CDX plywood (APA rated). Following physical properties and thermal properties are for the insulation component only.
1. Density (Nominal) in accordance with ÅSTM D1622: 2.0 pcf.
2. Compressive Strength in accordance with ASTM D1621: 20 psi.
3. Flame Spread in accordance with ÅSTM E84: 25 to 60.
4. Smoke Developed in accordance with ÅSTM E84: 75 to 160.
5. Water Vapor Transmission in accordance with ÅSTM E96: Less than 1.5 perms.
6. Water Absorption in accordance with ÅSTM C209: Less than 1 percent by volume.
7. Dimensional Stability in accordance with ÅSTM D2126: Less than 2 percent linear change.
8. Thickness: 2.5 inches (64mm).
    a. Long Term Thermal Resistance (LTTR): 6.0.
9. Thickness: 3.0 inches (76mm).
    a. Long Term Thermal Resistance (LTTR): 9.0.
10. Thickness: 3.5 inches (89mm).
    a. Long Term Thermal Resistance (LTTR): 12.1.
11. Thickness: 4.0 inches (102mm).
    a. Long Term Thermal Resistance (LTTR): 15.3.
12. Thickness: 4.5 inches (114mm).
    a. Long Term Thermal Resistance (LTTR): 18.5.
13. Thickness: 5.0 inches (127mm).
    a. Long Term Thermal Resistance (LTTR): 21.7.
14. Thickness: 5.5 inches (140mm).
    a. Long Term Thermal Resistance (LTTR): 25.0.

H. Multi-Vent Nailable Base-3: Composite product composed of a closed-cell polyisocyanurate roof insulation with glass fiber / organic mat facer on each side, vent blocks and a nailing panel on the top surface, such 7/16" or 5/8" OSB or CDX plywood (APA rated). Following physical properties and thermal properties are for the insulation component only.
1. Density (Nominal) in accordance with ASTM D1622: 2.0 pcf.
2. Compressive Strength in accordance with ASTM D1621: 20 psi.
3. Flame Spread in accordance with ÅSTM E84: 25 to 60.
4. Smoke Developed in accordance with ÅSTM E84: 75 to 160.

5. Water Vapor Transmission in accordance with ASTM E96: Less than 1.5 perms.
6. Water Absorption in accordance with ASTM C209: Less than 1 percent by volume.
7. Dimensional Stability in accordance with ÅSTM D2126: Less than 2 percent linear change.
8. Thickness: 2.5 inches (64mm).
    a. Long Term Thermal Resistance (LTTR): 6.0.
9. Thickness: 3.0 inches (76mm).
    a. Long Term Thermal Resistance (LTTR): 9.0.
10. Thickness: 3.5 inches (89mm).
    a. Long Term Thermal Resistance (LTTR): 12.1.
11. Thickness: 4.0 inches (102mm).
    a. Long Term Thermal Resistance (LTTR): 15.3.
12. Thickness: 4.5 inches (114mm).
    a. Long Term Thermal Resistance (LTTR): 18.5.
13. Thickness: 5.0 inches (127mm).
    a. Long Term Thermal Resistance (LTTR): 21.7.
14. Thickness: 5.5 inches (140mm).
    a. Long Term Thermal Resistance (LTTR): 25.0.

I. Thermaroof Plus-3: Closed-cell polyisocyanurate roof insulation with a reinforced aluminum foil facer on each side.
1. Density (Nominal) in accordance with ÅSTM D1622: 2.0 pcf.
2. Compressive Strength in accordance with ÅSTM D1621: 20 psi.
3. Flame Spread in accordance with ÅSTM E84: 25 to 60.
4. Smoke Developed in accordance with ASTM E84: 75 to 160.
5. Water Vapor Transmission in accordance with ÅSTM E96: Less than 0.3 perms.
6. Water Absorption in accordance with ASTM C209: Less than 1 percent by volume.
7. Dimensional Stability in accordance with ÅSTM D2126: Less than 2 percent linear change.
8. Class 1 roof insulation per FM Standard 4450 (1.5" minimum).
9. Thickness: 1.0 inches (25mm).
    a. Thermal Resistance (R): 6.0.
10. Thickness: 1.5 inches (38mm).
    a. Thermal Resistance (R): 9.6.
11. Thickness: 2.0 inches (51mm).
    a. Thermal Resistance (R): 13.1.
12. Thickness: 2.5 inches (64mm).
    a. Thermal Resistance (R): 16.7.
13. Thickness: 3.0 inches (76mm).
    a. Thermal Resistance (R): 20.3.
14. Thickness: 3.5 inches (89mm).
    a. Thermal Resistance (R): 23.9.
15. Thickness: 4.0 inches (102mm).
    a. Thermal Resistance (R): 27.4.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

3.4 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION