

1 GENERAL

1.1 SUMMARY OF WORK

- A. This Section specifies roof and deck insulation.

1.2 RELATED REQUIREMENTS

- .1 Section [_____].

1.3 REFERENCE STANDARDS

- A. ASTM International (ASTM).
1. ASTM C165 - [2012], Standard Test Method for Measuring Compressive Properties of Thermal Insulations.
 2. ASTM C209 - [2012], Standard Test Methods for Cellulosic Fiber Insulating Board.
 3. ASTM C303 - [2010], Standard Test Method for Dimensions and Density of Preformed Block and Board-Type Thermal Insulation.
 4. ASTM C356 - [2010], Standard Test Method for Linear Shrinkage of Preformed High-Temperature Thermal Insulation Subjected to Soaking Heat.
 5. ASTM C423 - [2009a], Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
 6. ASTM C518 - [2010], Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
 7. ASTM C665 - [2011], Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
 8. ASTM C726 - [2012], Standard Specification for Mineral Fiber Roof Insulation Board.
 9. ASTM C1104/C1104M - [2013], Standard Test Method for Determining the Water Vapor Sorption of Unfaced Mineral Fiber Insulation.
 10. ASTM E84 - [2012], Standard Test Method for Surface Burning Characteristics of Building Materials.
 11. ASTM E96/E96M - [2010], Standard Test Methods for Water Vapor Transmission of Materials.
 12. ASTM E136 - [2011], Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 degrees C.
- B. US Green Building Council (USGBC).
1. LEED v4-[2014], LEED (Leadership in Energy and Environmental Design): Green Building Rating System.
- C. Factory Mutual Global Inc.(FM).
1. FM 4450-[1989], Approval Standard for Class 1 Insulated Steel Decks.
 2. FM 4470-[2012], Approval Standard for Single-Ply, Polymer-Modified Bitumen Sheet, Built-Up Roof (BUR) and Liquid Applied Roof Assemblies for use in Class 1 and Noncombustible Roof Deck Construction.
 3. FM 4473-[2011], Impact Resistance Testing of Rigid Roofing Materials by Impacting with Freezer Ice Balls.
- D. Underwriters' Laboratories (UL).
1. UL 263 - [2011], Fire Tests of Building Construction and Materials.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Co-ordination: Co-ordinate work of this Section with roofing or deck work and with work of other trades for proper time and sequence to avoid construction delays.

- B. Pre-installation Meeting: Convene pre-installation meeting after Award of Contract and [one week] before starting work of this Section to verify project requirements, substrate conditions and coordination with other building sub-trades, and to review manufacturer's written installation instructions.
1. Comply with Section 01 31 19 - Project Meetings and co-ordinate with other similar pre-installation meetings.
 2. Notify attendees 2 weeks prior to meeting and ensure meeting attendees include as minimum:
 - a. Owner;
 - b. Consultant;
 - c. [Roofing] [Deck] Subcontractor;
 - d. Manufacturer's Technical Representative.
 3. Ensure meeting agenda includes review of methods and procedures related to insulation installation including co-ordination with related work.
 4. Record meeting proceedings including corrective measures and other actions required to ensure successful completion of work and distribute to each attendee within 1 week of meeting.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- A. Make submittals in accordance with Contract Conditions and Section 01 33 00 - Submittal Procedures.
- B. Product Data: Submit product data including manufacturer's literature for insulation materials and accessories, indicating compliance with specified requirements and material characteristics.
1. Submit list on insulation manufacturer's letterhead of materials and accessories to be incorporated into Work.
 2. MSDS report.
 3. Include product name.
 4. Include preparation instructions and recommendations, installation methods, and storage and handling requirements.
 5. Include contact information for manufacturer and their representative for this Project.
- C. Samples:
1. Submit [6 x 6] inches minimum sample of insulation in thickness used on Project.
- D. Test Reports:
1. Submit evaluation service reports or other independent testing agency reports showing compliance with specified performance characteristics and physical properties.
- E. Field Reports: Submit manufacturer's field reports within 3 days of each manufacturer representative's site visit and inspection.
- F. Sustainable Design (LEED).
1. LEED Submittals: In accordance with Section [01 35 21 – LEED Requirements]
 2. Submit verification for items as follow:
 - a. EA Credit 1: Thermal value of insulation contributing to overall energy performance of building.
 - b. MR Credits 4.1 and 4.2: Recycled content of insulation indicating percentages by weight of preconsumer and postconsumer recycled content.
 - c. MR Credits 5.1 and 5.2: Verify location where insulation is extracted, processed and manufactured.
- G. [Roofing] [Deck] Subcontractor Qualifications:
- .1 Submit letter verifying [roofing] [deck] subcontractor's experience with work similar to work of this Section.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: Supply maintenance data for insulation materials for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
- B. Sustainable Design Closeout Documentation (LEED).

1. Provide calculations on end-of-project recycling rates, salvage rates, and landfill rates for work of this Section demonstrating percentage of construction wastes which were recycled.
 2. Submit verification from recycling facility showing receipt of materials.
- C. Record Documentation: In accordance with Section 01 78 00 - Closeout Submittals.
1. List materials used in insulation work.
 2. Warranty: Submit warranty documents specified.

1.7 QUALITY ASSURANCE

- A. [Roofing] [Deck] Subcontractor Quality Assurance: Work experience of [5] years minimum with work similar to work of this Section.
- B. Sustainability Standards Certification (LEED).
1. LEED submittals: In accordance with Section 01 35 21 - LEED Requirements.

1.8 DELIVERY STORAGE AND HANDLING

- A. Delivery and Acceptance Requirements:
1. Deliver material in accordance with Section 01 61 00 - Common Product Requirements.
 2. Deliver materials and accessories in insulation manufacture's original packaging with identification labels intact and in sizes to suit project.
 3. Ensure insulation materials are not exposed to moisture during delivery.
 4. Replace wet or damaged insulation materials.
- B. Storage and Handling Requirements: Store materials off ground in dry location and protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.
1. Store in original packaging until installed.
- C. Packaging Waste Management:
1. Separate and recycle waste packaging materials in accordance with Section 01 74 19 - Construction Waste Management and Disposal.
 2. Remove waste packaging materials from site and dispose of packaging materials at appropriate recycling facilities.
 3. Collect and separate for disposal paper and plastic material in appropriate on-site storage containers for recycling [in accordance with Waste Management Plan].

1.9 WARRANTY

- A. Project Warranty: Refer to Contract Conditions for project warranty provisions.
- B. Manufacturer's warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to and not intended to limit other rights Owner may have under Contract Conditions.
- C. Warranty period: [1] years commencing on Date of Substantial Performance of Work.

2 PRODUCTS

2.1 MANUFACTURER

- A. Manufacturer: ROCKWOOL, 8024 Esquesing Line, Milton, Ontario, L9T 6W3, Phone: 905-878-8474, Toll Free: 1-800-265-6878, e-mail: contactus@rockwool.com, URL: www.rockwool.com.

2.2 DESCRIPTION

- A. Rigid, monolithic, dual-density mineral wool insulation board [intended for use with mechanically fastened or ballasted roofing membranes] to ASTM C726, complete with high density top layer, no cover board required.

- B. Rigid, monolithic, dual-density mineral wool insulation board [intended for use with hot asphalt, torch applied or cold adhered roofing membranes] [impregnated with bitumen top layer] to ASTM C726, complete with high density top layer, no coverboard required.
- C. Rigid, mono-density mineral wool insulation board [intended for use with mechanically fastened or ballasted roofing membranes] to ASTM C726.
- D. Rigid, mono-density mineral wool insulation board [intended for use with hot asphalt, torch applied or cold adhered roofing membranes] [impregnated with bitumen top layer] to ASTM C726.

2.3 PERFORMANCE CRITERIA

- A. Low-Slope Roofing Insulation Board: To ASTM C726.
 - 1. Fire performance:
 - a. Rated roof insulation: To FM Approval 4450/4470, [Class 1-NCC (non-combustible core)] [Class 1-90].
 - b. Non-combustibility: To ASTM E136.
 - c. External spread of flame on roof surface: To UL 790, Class A.
 - d. Thermal degradation and charring: To UL 263.
 - e. Surface Burning Characteristics: To ASTM E84.
 - 1) Flame spread: 0.
 - 2) Smoke developed: 0.
 - 2. Water Vapour Transmission: To ASTM E96, 40.775 Perm.
 - 3. Moisture Resistance: To ASTM C1104, moisture sorption of 0.15 %.
 - 4. Water absorption less than [1.0] [1.2] %: To ASTM C209.
 - 5. Thermal resistance: To ASTM C518,
 - a. R 4.3 hr.ft².F/Btu at 25 °F.
 - b. R 4.2 hr.ft².F/Btu at 40 °F.
 - c. R 3.8 hr.ft².F/Btu at 75 °F.
 - d. R 3.6 hr.ft².F/Btu at 110 °F.
 - 6. Hail damage resistance: To FM 4470, Class 1-SH.
 - 7. Impact resistance: To FM 4473, Class 4 and UL 2218, Class 4.
 - 8. Corrosive resistance: To ASTM C665, Corrosive to steel - Pass.
 - 9. Stainless steel stress corrosion: To ASTM C871 and ASTM C692.
 - 10. Compressive strength of entire board: To ASTM C165, at 10 %: 10.88 psi.
 - 11. Density: To ASTM C303.
 - a. Top layer: 13.7 lb/ft³.
 - b. Bottom layer: [10lb/ft³] [9.36lb/ft³]
 - 12. Recycled content: [40] [16] % minimum.
- B. Low-Slope Roofing Insulation Protection or Cover Board: To ASTM C726.
 - 1. Fire performance:
 - a. Rated roof insulation: To FM Approval 4450/4470, [Class 1-NCC (non-combustible core)] [Class 1-90].
 - b. Non-combustibility: To ASTM E136.
 - c. External spread of flame on roof surface: To UL 790, Class A.
 - d. Thermal degradation and charring: To UL 263.
 - e. Surface Burning Characteristics: To ASTM E84.
 - 1) Flame spread: 0.
 - 2) Smoke developed: 0
 - 2. Water Vapour Transmission: To ASTM E96, 41.3 Perms
 - 3. Moisture Resistance: To ASTM C1104, moisture sorption of 0.3 %.
 - 4. Water absorption less than [1.0] [1.2] %: To ASTM C209.
 - 5. Thermal resistance: To ASTM C518,
 - a. R 4.4 hr.ft².F/Btu at 25 °F.
 - b. R 4.3 hr.ft².F/Btu at 40 °F.
 - c. R 4.0 hr.ft².F/Btu at 75 °F.
 - d. R 3.7 hr.ft².F/Btu at 110 °F..
 - 6. Hail damage resistance: To FM 4470, Class 1-SH.

7. Impact resistance: To FM 4473, Class 4 and UL 2218, Class 4.
8. Corrosive resistance: To ASTM C665, Corrosive to steel - Pass.
9. Stainless steel stress corrosion: To ASTM C871 and ASTM C692.
10. Compressive resistance: To ASTM C165, 10 % deformation 11 psi.
11. Density: To ASTM C303, 12.5 lb/ft³.
12. Recycled content: [40] % minimum.

2.4 MATERIALS

- .1 Low-Slope Roofing Insulation Cover Board: Stone wool fibre insulation board.
 - .1 Size: 48 x 48 inches.
 - .2 Thickness: [2] [2.5] [3.0] [3.5] [4] [4.5] [5] [5.5] [6] inches.
 - .3 Acceptable material: ROCKWOOL, TOPROCK DD [PLUS].
- .2 Low-Slope Roofing Insulation Cover and Protection Board: Stone wool fibre insulation board.
 - .1 48 x 48 inches.
 - .2 Thickness: 1.04 inches.
 - .3 Acceptable material: ROCKWOOL, MONOBOARD [PLUS].

2.5 ACCESSORIES

- A. Protection or Cover Board: Rigid, monolithic, dual-density mineral wool protection or cover board [intended for use with mechanically fastened or ballasted roofing membranes] [intended for use with hot asphalt, torch applied or cold adhered roofing membranes] [impregnated with bitumen top layer] to ASTM C726.
 1. Size: 48 x 48 inches
 2. Thickness/R: 1.04 inches/R 4.
- B. Protection or Cover Board: Rigid, mono-density mineral wool insulation board [intended for use with hot asphalt, torch applied or cold adhered roofing membranes] [intended for use as a cover board] [impregnated with bitumen top layer] to ASTM C726.
 1. Acceptable material: ROCKWOOL, [MONOBOARD] [MONOBOARD PLUS] [TOPROCK DD [PLUS]].
- C. Mechanical fasteners in accordance with insulation manufacturer's written recommendations.

2.6 SOURCE QUALITY CONTROL

- A. Ensure insulation components and accessories are supplied or approved in writing by single manufacturer.

2.7 PRODUCT SUBSTITUTIONS

- A. Substitutions: [In accordance with Section 01 23 13 - Product Substitution Procedures] [No substitutions permitted].

3 EXECUTION

3.1 INSTALLERS

- A. Use only installers with [5] years minimum experience with work similar to work of this Section.

3.2 EXAMINATION

- A. Verification of Conditions: Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for insulation installation in accordance with manufacturer's written recommendations.
 1. Visually inspect substrate in presence of Consultant.
 2. Ensure surfaces are free of snow, ice, frost, grease and other deleterious materials.

3. Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.

B Start of insulation installation indicates installer's acceptance of substrate installation conditions.

3.3 INSTALLATION

A. Install insulation in accordance with manufacturer's written recommendations.

B. Install roof insulation in layers and in thicknesses indicated and in accordance with Section [07 50 00 - Membrane Roofing] [07 51 00 - Built-Up Bituminous Roofing] [07 52 00 - Modified Bituminous Membrane Roofing] [07 53 00 - Elastomeric Membrane Roofing] [07 54 00 - Thermoplastic Membrane Roofing] [07 55 00 - Protected Membrane Roofing] [07 56 00 - Fluid-Applied Roofing] [07 58 00 - Roll Roofing].

C. Install protection of cover board where indicated.

1. Install protection or cover board in courses parallel to decking flutes with board ends staggered.
2. Ensure board joints are flush and tightly butted together without gaps.
3. Mechanically fasten boards where indicated and in accordance with manufacturer's written recommendations.

D. [Temporarily seal] [Cover with moisture retardant barrier] exposed edges at completion of each work day.

3.4 FIELD QUALITY CONTROL

A. Field Inspection: Coordinate field inspection in accordance with Section [01 45 00 - Quality Control].

B. Manufacturer's Services:

1. Coordinate manufacturer's services with Section [01 45 00 - Quality Control].
 - a. Arrange for payment for manufacturer's services.
 - b. Have manufacturer review work involved in handling, installation, protection, and cleaning of insulation and accessories, and submit written reports in acceptable format to verify compliance of Work with Contract conditions.
2. Manufacturer's Field Services: Provide manufacturer's field services consisting of product use recommendations and periodic site visits for product installation review in accordance with manufacturer's instructions.
 - a. Report any inconsistencies from manufacturer's recommendations immediately to Consultant.
3. Schedule site visits to review work at stages listed:
 - a. After delivery and storage of drainage sheet and accessories, and when preparatory work on which Work of this Section depends is complete, but before installation begins.
 - b. Twice during progress of work at 25% and 60% complete.
 - c. Upon completion of Work, after cleaning is carried out.
 - d. Obtain reports within three days of review and submit immediately to Consultant.

3.5 CLEANING

A. Progress Cleaning: Perform cleanup as work progresses [in accordance with Section 01 74 00 - Cleaning and Waste Management].

1. Leave work area clean at end of each day.

B. Final Cleaning: Upon completion, remove surplus materials, rubbish, tools, and equipment [in accordance with Section 01 74 00 - Cleaning and Waste Management].

C. Waste Management:

1. Co-ordinate recycling of waste materials with 01 74 19 - Construction Waste Management and Disposal.
2. Collect recyclable waste and dispose of or recycle field generated construction waste created during construction or final cleaning related to work of this Section.
3. Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.6 PROTECTION

- A. Protect installed products and accessories from damage during construction.
- B. Repair damage to adjacent materials caused by insulation installation.

END OF SECTION 07 22 00 – ROOF AND DECK INSULATION