1.0 GENERAL NOTES

1.1 This standard applies to insulation for use in steep slope roofing systems.

1.2 Steep slope roofing is defined as a roof slope with an incline of 2:12 and greater (Approval Standards for Class 1 Steep Slope Roof Covers FM 4475) or 3:12 and greater (NRCA Manual).

1.3 The design and construction of the roof deck and supporting structure is the responsibility of the project architect, engineer, general contractor and the building owner. The structure must be designed to resist all live, dead, snow, wind and construction loadings without excessive deflections as dictated by the governing building codes.

1.4 The selection and use of Rmax insulations, as well as other roofing system components, to meet the requirements for any given project is at the sole discretion of the owner or his designated agent or representative. Rmax will provide available information requested by the designer to aid in this decision process.

1.5 The selection and use of any Rmax product should be based on the quality of the product and on the specific requirements for the entire roof system rather than solely on economic considerations.

1.6 High quality products cannot take the place of poor quality installation. Rmax recommends that only skilled, trained workmen familiar with Rmax products and the various other components of the roofing system be used to perform the required work.

1.7 NO WARRANTY, EXPRESSED OR IMPLIED, AS TO CHARACTERISTICS, PHYSICAL PROPERTIES OR PERFORMANCE UNDER ANY VARIATIONS FROM CONTROLLED CONDITIONS AT THE TIME OF MANUFACTURE IS MADE. These provisions may not be altered in any way by a salesperson, employee, agent or any other representative of Rmax, except by a letter from an officer of Rmax.

1.8 **WARNING:** Polyisocyanurate is an organic material which will burn when exposed to an ignition source of sufficient heat and intensity and may contribute to flames spreading.

1.9 Rmax does not assume any responsibility or liability for the performance of any products other than those manufactured by Rmax.

1.10 Rmax recommends that no insulation be installed on a roof deck until all other trades are finished on the roof.

1.11 Wind uplift ratings are based on approvals and specifications developed by the roof cover manufacturer.

2.0 ROOF DECKS

2.1 ***Deck Design:***

2.1.1 The roof deck must be designed to resist all live, dead, snow and wind loadings without excessive deflections as dictated by the governing building codes. The roof deck should be designed to resist the construction loads without excessive deflections. The deck shall be adequately secured into the building structure to resist wind uplift forces and prevent lateral movement of various sections. Design and construction of the roof deck is not the responsibility of Rmax.

2.1.2 Rmax insulation products should only be installed over decks that will sufficiently support the weight of the roofing system and transient loads during the application of the roofing system.

2.1.3 Rmax insulation may be applied over steel and wood decks.

2.1.4 Roof decks shall be prepared to receive the roofing system, including the Rmax insulation, as specified by the roofing system supplier. Rmax does not formally approve the use of any particular roof deck for any roofing system.

2.1.5 The roof deck must be designed for proper drainage. Providing for the adequate drainage of a roofing system is the sole responsibility of the project architect, engineer or designer.

2.2 ***Deck Surfaces:***

2.2.1 Deck surfaces shall be smooth. All finished surfaces shall be free of under driven fasteners, holes, ridges or depressions that will affect the placement or performance of the insulation.

2.2.2 Deck surfaces shall be free of water or other surface moisture. Deck surfaces shall be clean of all debris and trash prior to installing the insulation. Do not leave sawdust or other extraneous materials in the flutes of steel decks.

2.2.3 All deck surface irregularities, such as low or high spots should be repaired so the surface is flat to receive the insulation. It is the responsibility of the roofing contractor to ensure that the roof deck is properly prepared to receive the insulated roofing system.

2.2.4 **DO NOT** score, slash or otherwise cut either facing of the Rmax insulation product in order to force the panel to conform to deck irregularities.

2.3 ***Insulation Stops / Deck Penetrations:***

2.3.1 All roof deck openings, edges and eaves shall have treated wood nailers installed as insulation stops. Wood nailers should be of a thickness equal to the thickness of the insulation.

2.3.2 All roof deck penetrations and projections shall be completed prior to the application of the insulation.

3.0 MATERIALS

3.1 ***Rmax Insulations:***

3.1.1 Rmax manufactures a variety of polyisocyanurate foam insulation products for different steep slope roof applications. See the Rmax website at www.rmax.com for data sheets on each product:

Non-Composite Products

Durasheath®-3	Thermaroof® Plus-3
Eco-Max®	Thermasheath®-3
Multi-Max® FA-3	Thermasheath® Plus-3
Ultra-Max®-3	Re-Cover Board-3

Composite Products

Advantage Vented Nailable Base-3	Nailable Base-3
Multi-Vent Nailable Base-3	Vented Nailable Base-3

3.2 ***Storage and Protection:***

3.2.1 Rmax insulation is shipped in polyethylene wrapped bundles, approximately 48 inches high. These wrapping materials are not adequate for weather protection of the insulation at the job site.

3.2.2 Insulation bundles shall be stored on pallets or other dunnage at least 4 inches above the ground level. Dunnage supplied by Rmax for shipment of the insulation is not adequate for use in storage of the materials. Bundles placed directly on the ground are not properly stored and may cause the Rmax warranties to become void.

3.2.3 Insulation bundles should not be placed on the steep slope of the roof deck for storage. Insulation bundles placed directly on the deck systems for storage are not properly stored and may cause Rmax warranties to become void. Cover the bundles with a tarpaulin or other suitable “breathable” protection cover.

3.2.4 **Warning: DO NOT** use wet insulation products within a roofing assembly. Installation of wet insulation or other roofing system components shall cause the Rmax warranties to become void. Rmax insulation that has become wet may experience dimensional stability problems and every precaution must be taken in order to determine if the insulation is still useable. Rmax insulation that has become wet may only be applied in a roof system if dimensional changes have not occurred and after it has been dried thoroughly. All other roofing materials shall be stored as recommended by the supplier.

3.2.5 Rmax recommends that insulation bundles be unloaded from trucks by a fork-lift truck or similar equipment with suitable forks to slide under bundles. Rolling or tumbling bundles off delivery trucks will damage the insulation and may cause the Rmax warranties to become void.

3.3 ***Attachments:***

3.3.1 Mechanical Fasteners: Rmax recommends that any non-composite insulation product which is laid over a wood or steel roof deck be attached with FM Global approved screw and plate type mechanical fasteners. Rmax recommends that any composite insulation which is laid over a wood or steel roof deck be attached with FM Global approved screw type mechanical fasteners without plates. Fasteners must also be acceptable to the roofing system supplier. The selection and use of any fastener is the responsibility of the roofing contractor. Contact Rmax sales for information, pricing and availability of Rmax Nail Board Fasteners.

3.4 ***Moisture and Vapor Retarders:***

3.4.1 Water can cause significant damage to most types of building materials. Water especially affects foam insulation by reducing its insulation properties (R-value) and adversely affecting dimensional stability. Some facing materials on foam insulation lose important physical properties when exposed to water. Moisture migration into the roofing system must be controlled to a level to not compromise the performance of the insulation.

3.4.2 Construction processes can generate enough moisture under certain conditions to condense in the roofing system and cause permanent damage. Adequate ventilation should be provided to preclude this possibility or a vapor retarder should be used to limit moisture-laden air from migrating into the roofing system. Rmax will not assume responsibility for insulation performance when installed under high-moisture conditions.

3.4.3 Vapor retarders are used to control the flow of moisture from a warm, humid area into a colder, drier area. Vapor retarders are placed to the warm side of the roof deck insulation. Rmax strongly recommends that the decision to use or not use a vapor retarder in any insulated roofing assembly be guided by the recommendations of the National Roofing Contractors Association in the latest edition of the “NRCA Roofing and Waterproofing Manual”. The decision to use a vapor retarder and the selection of the details of the retarder construction is left to the building architect, designer, building owner or their designated representative or agent.

3.4.4 Using two layers of insulation and offsetting joints will further reduce moisture migration into a roofing system. See Section 4.5 for Rmax’s recommendations for using multi-layer insulation systems.

4.0 INSULATION INSTALLATION

4.1 ***General:***

4.1.1 No more insulation shall be laid than can be covered with the completed roofing system by the end of the work for the day.

4.1.2 Do not shave, rasp or carve facers off any insulation panel. Removal of any portion of the insulation facer may cause the panel to warp or curl.

4.1.3 **DO NOT** force rigid insulation to bend over roof ridges, deck irregularities or conform to deck low points. Cut insulation panels around such details. Rmax does not recommend scoring or cutting the back side of an insulation panel to allow the board to conform to roof deck shapes or irregularities.

4.1.4 Rmax does not recommend the cutting or trimming of insulation panels with the “score and snap” method. Specifically, Rmax does not recommend that one side of a panel be scored with a sharp knife and then completing the “cut” by breaking the panel along the scored line. Polyisocyanurate will not break cleanly or evenly. Instead, Rmax recommends the use of a sharp, fine-toothed saw for cutting or trimming insulation panels.

4.1.5 Furnish all labor, material, tools, equipment and services for all preformed roofing as indicated, in accord with the provisions of the Contract Documents. The manufacturer will provide all components required for a complete roofing system to include panels, panel clips, trim/flashing, façades, ridge, closures, sealants, fillers and any other required items.

4.1.6 Completely coordinate with work of all other trades.

4.2 ***Architectural Metal Panel Roof Systems:***

4.2.1 All products listed in this document are suitable for use under Architectural Metal Panel Roof Systems.

4.2.2 **Composite products** may be fastened to wood or steel roof decks with fifteen (15) mechanical fasteners per every four (4) foot by eight (8) foot board (refer to actual data sheets for required fastening patterns). The fasteners shall be of a length at least one inch longer than the composite thickness of the insulation panel. The insulation panels shall be installed with the long dimension perpendicular to the slope of the roof. All joints shall be spaced to leave a 1/8" gap between panels to allow for expansion of the nailing surface. Note: Only the nailable surface layer of Advantage Vented Nailable Base-3 needs to be installed allowing a 1/8" gap between panels; the foam insulation layer shall have tightly butted joints.

4.2.3 **Non-composite products** may be fastened to wood or steel roof decks with one (1) mechanical fastener every (4) square feet.

4.2.4 Insulation is to be laid on the roof deck with staggered joints.

4.2.5 Attachment of the securing brackets and/or devices must be with screws of sufficient length to penetrate the insulation and engage the roofing deck and/or roof structure below by a minimum of one inch. Bearing plates and other details of construction shall be applied per the metal roofing panel manufacturer.

4.3 ***Asphalt Shingles:***

4.3.1 All products listed in this document are suitable for use under Asphalt Shingles.

4.3.2 **Warning:** Consult shingle manufacturer for information regarding warranty and application methods. Some shingle manufacturers do not allow their products to be installed over non-vented insulated decks.

4.3.3 Rmax recommends Advantage Vented Nailable Base-3 or Multi-Vent Nailable Base-3 in lieu of Nailable Base-3 or Vented Nailable Base-3 within an asphalt shingle roofing system where only a single layer of foam is to be installed. "Thermal short circuits" are a direct link between the heated roof deck and the roof covering. The most common occurrence of this is when Vented Nailable Base-3 or Nailable Base-3 is laid directly onto a steel or wood deck and gaps are left between the 4' x 8' insulation panels. The heated air from the structure below finds its way directly to the underlayment and shingles bridging these gaps. This effect may result in a windowpane effect at a minimum and large buckles or ridges in severe cases. Advantage Vented Nailable Base-3 and Multi-Vent Nailable Base-3 systems allow any thermal and moisture contributions from the roof deck to be channeled into the vent spaces of the nailable surface dissipating the heat and moisture. For more information and recommendations on how to prevent "thermal short circuits", refer to Rmax Technical Bulletin #102.

4.3.4 **Composite products** may be fastened to wood or steel roof decks with fifteen (15) mechanical fasteners per every four (4) foot by eight (8) foot board (refer to actual data sheets for required fastening patterns). The fasteners shall be of a length at least one inch longer than the composite thickness of the insulation panel. The insulation panels shall be installed with the long dimension perpendicular to the slope of the roof. All joints shall be spaced to leave a 1/8" gap between panels to allow for expansion of the nailing surface. Note: Only the nailable surface layer of Advantage Vented Nailable Base-3 needs to be installed allowing a 1/8" gap between panels; the foam insulation layer shall have tightly butted joints.

4.3.5 **Non-composite products** may be fastened to wood or steel roof decks with one (1) mechanical fastener every (4) square feet. The insulation must be covered with a suitable layer of plywood prior to application of the underlayment and shingles.

4.3.6 Insulation is to be laid on the roof deck with staggered joints.

4.4 ***Roofing Tiles/Shakes:***

4.4.1 All products listed in this document are suitable for use under Roofing Tiles/Shakes Systems.

4.4.2 **Composite products** may be fastened to wood or steel roof decks with fifteen (15) mechanical fasteners per every four (4) foot by eight (8) foot board (refer to actual data sheets for required fastening patterns). The fasteners shall be of a length at least one inch longer than the composite thickness of the insulation panel. The insulation panels shall be installed with the long dimension perpendicular to the slope of the roof. All joints shall be spaced to leave a 1/8" gap between panels to allow for expansion of the nailing surface. Note: Only the nailable surface layer of Advantage Vented Nailable Base-3 needs to be installed allowing a 1/8" gap between panels; the foam insulation layer shall have tightly butted joints.

4.4.3 **Non-composite products** may be fastened to wood or steel roof decks with one (1) mechanical fastener every (4) square feet. The insulation must be covered with a suitable layer of plywood prior to application of the underlayment and tiles/shakes.

4.4.4 Insulation is to be laid on the roof deck with staggered joints.

4.5 ***Multi-Layer Insulation Systems:***

4.5.1 The roofing industry has long recognized the advantages of multi-layered insulation systems; e.g., the reduction of thermal losses through insulation joints and thermal bridging, reduced moisture migration into the roof system and less movement in the system thereby reducing mechanical stress on the membrane.

4.5.2 Rmax recommends two layers of insulation whenever the total insulation requirement exceeds 3.0 inches.

4.5.3 Joints should be offset between the various layers of insulation as well as between the insulation and a cover board.

4.5.4 Failure to follow these recommendations for multi-layer applications will release Rmax from any responsibility for roof system performance.

4.6 ***Roof System Ventilation:***

4.6.1 Rmax manufactures a variety of polyisocyanurate foam products in conjunction with wood components to create a vented assembly. These include Vented Nailable Base-3, Advantage Vented Nailable Base-3 and Multi-Vent Nailable Base-3.

4.6.2 Rmax's vented products are superior for use in applications where a vented, nailable surface is needed to dissipate heat and moisture for design or warranty reasons. It should be noted that Rmax recommends the use of Advantage Vented Nailable Base-3 or Multi-Vent Nailable Base-3 in lieu of Vented Nailable Base-3 to prevent "thermal short circuits". For more information and recommendations on how to prevent "thermal short circuits", refer to Rmax Technical Bulletin #102.

4.6.3 Non-vented Rmax products may also be used in a ventilated roofing assembly by attaching furring strips between the insulation layer and the nailable surface. The furring strips must be attached through the insulation to the roof deck below.

4.6.4 Ridge and soffit vents are components of a completed ventilated roof system in combination with Rmax roofing products. These components must be combined in a balanced assembly for the ventilation system to be effective. Recommendations of the vent manufacturer or other design professional should be followed. Specific design considerations should be made to ensure adequate ventilation at hips and valleys.

4.7 ***Roof Protection:***

4.7.1 Completed portions of the roofing system shall not be used for storage surfaces or work surfaces without adequate protection first placed over the insulation. Rmax recommends that no insulation be installed on a roof until all other trades are finished on the roof.

4.7.2 Remove all debris, including any cut dust, from roof daily. Protect material and take precautions to prevent other trades from damaging the roof during and after installation.

5.0 REROOF/RECOVER SYSTEMS

5.1 ***General:***

5.1.1 Definitions: Rmax shall recognize the use of the terms "reroof" and "recover" as defined below:
REROOF - the practice of removing the existing roofing material(s) and any associated insulation down to the original roof deck, the repair/replace of any deteriorated roof structure elements and installing a new insulated roof system
RECOVER - the practice of preparing the existing roofing surface, such as removal of debris and repair of deteriorated areas, and installing a new insulated roof system

5.1.2 Rmax insulation may be used in reroofing systems where the existing roof system, including the deck below, is still sound and attached.

5.1.3 Rmax recommends that in all projects where roof replacement is necessary, the existing deteriorated roof system be removed to the original roof deck and a new roofing system be installed. Rmax strongly recommends that the roofing system be torn off and not "recovered" when two or more roofing systems are present over the roof structure. **NOTE**: Three or more roof materials on a roof structure may violate local building codes.

5.1.4 Rmax recommends that when the existing roof system is not to be torn off, the existing roof system and deck should be thoroughly investigated for water intrusion and deterioration. Wet or deteriorated zones require complete removal of the affected area and repairs made to restore a level substrate to begin work.

5.1.5 The deck and structure must be investigated by competent engineers to determine if the new imposed loads of the reroof system may be added.

5.2 ***Installation Requirements:***

5.2.1 Rmax recommends the existing roofing materials be addressed, as applicable, to produce a smooth surface. All surfaces must be swept clear of dust, dirt and debris. Application of Rmax insulation products on loose or protruding materials will crush the insulation and damage the facers. This damage can cause the insulation to become dimensionally unstable and lose R-value.

5.2.2 A flat and level surface is required prior to installing the insulation. Uneven surfaces must be filled or covered with a minimum 1/2-inch thick wood fiberboard, gypsum board or perlite prior to application of the Rmax insulation and new roofing system.

5.2.3 Rmax insulation shall be installed in the reroof system, depending upon the new roof cover, as specified in section 4.0 of this document.

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