Between the World and The Weather Since 1928

Ram-Tough 250 Waterproofing Systems

Horizontal Surfaces Application Guide

DESIGN CONSIDERATIONS

The proper specification and detailing of any waterproofing system is extremely important for long term performance. This guide will assist designers and applicators obtain the desired results. Although major topics of consideration are discussed in detail, other elements (e.g. structural framing, climate, interior conditions, etc.) may be important and must be taken into consideration. It is the responsibility of the design professional to take the material presented in this guide and determine that all segments of the overall project design are appropriate.

As an additional reference guide, the Barrett Company recommends the National Roofing Contractors Association's (NRCA) Roofing and Waterproofing Manual. The information contained in this publication has been developed by industry from actual field experience and scientific evaluations from experts. If presented with a situation not covered in this guide or the NRCA Manual, consult Barrett Technical Services for clarification.

CONCRETE DECK PREPARATION

Do not apply Ram-Tough 250 over lightweight structural concrete of less than 3000 PSI compressive strength or over light- weight insulating concrete unless approved in writing by Barrett and the concrete manufacturer. Vented metal pan decks are preferred.

Concrete should be moisture cured initially and generally allowed to stand for 28 days. Do not use liquid curing compounds or calcium chlorides unless approved in writing by the Barrett Company and the curing compound manufacturer. Conduct a deck dryness test in accordance with ASTM D-4263 procedures.

Concrete surfaces to be waterproofed shall be wood float or broom finish (A.C.I.301-11.7.3) free of excessive roughness, with a clean, dry surface. All honeycombs, voids, cracks and pockmarks shall be patched with non-shrinking grout applied with a bonding agent. Concrete surface preparation shall conform with ASTM D-5295.

Vertical surfaces with form voids or pockmarks should be repaired by packing with non-shrinking grout applied with a bonding agent. All surfaces must be free of loose mortar and laitance. All tie-ends on foundation walls must be cut off flush with the wall surface and repaired with a non-shrinking grout applied with a bonding agent. Please see Ram Tough 250VM Vertical Surfaces Application Guide.

All surfaces to be waterproofed must be free of grease, oil, laitance, loose aggregate, form release, curing compounds, dirt and other contaminants.

Metalwork must be in place, securely attached and accurately fitted. It is very important that the metal be cleaned of all process oils with a solvent cleaner and that it be free of rust and other contaminants. Wire brush to a bright metal finish prior to priming.

SURFACE INSPECTION:

Prior to commencing work, the applicator should inspect all substrate surfaces. The architect/specifier, general contractor and Barrett shall be notified of unacceptable conditions. Remedial corrections shall be performed prior to Applicator commencing work. No work shall be undertaken until all adverse conditions are rectified.

ENVIRONMENTAL CONDITIONS:

The waterproofing installation may proceed when the ambient temperature is above 0°F. Special application procedures should be followed below 30°F. All surfaces to be waterproofed must be thoroughly clean and dry at the commencement of any work.

HEATING Ram-Tough 250:

Use double-jacketed, hot air or oil bath melters with mechanical agitation, specifically designed for hot-applied, rubberized asphalt materials. The melter must be operated by a workman thoroughly familiar with the equipment. Check heat transfer oil level daily before starting burners. Allow sufficient space for thermal expansion. Replace with heat transfer oil as recommended by melter manufacturer.

Melter must be free of foreign materials. Begin melter warm-up early enough to have hot fluid material when the work is schedule to start. Cold weather start-up will take longer. Ignite

burners and add 7-8 cubes of Ram-Tough 250 cut into quarters. Discard the outer polyethylene wrapper. The inner polyethylene wrapper may be added with material. When material is molten, start agitator drive motor and leave on at all times while melter is in operation. Replace material throughout the day as it is withdrawn from the melter. Add Ram-Tough 250 cut into half, sufficient to maintain melter at capacity. Each cube is equal to a little more than three fluid gallons.

Maintain oil-bath at approximately 500°F and material temperature at 375°F to 400°F, with constant agitation. Do not over- heat Ram-Tough 250. Overheating will cause the Ram-Tough 250 to cross-link and line the walls of the melter, adversely affecting the melter. Discard all overheated materials off site in conformance with applicable environmental regulations. It is also important not to hold Ram-Tough 250 material at elevated temperatures for prolonged periods of time. Generally, the upper holding time limit is four (4) hours at 400°F.

PREPARATORY WORK:

1. Projections

Exposed metal projections and surfaces shall be cleaned with a powered wire brush and a solvent wash and then primed with Ram Primer/Surface Conditioner. Allow to dry tack-free. Install a 1 inch cant of ram-Tough 250 as shown in drawings to extend from the primed metal 12 inches on to the deck. Allow the hot Ram-Tough 250 to cool somewhat and tool into place with a trowel. Re-coat and install ram Pipe Boot or a two (2) piece Ram Flash 327 HDR Flashing Sheet, base portion first, the a.k.a. “target & wrap”, or primed sheet metal sleeve flashing.

2. Flashings

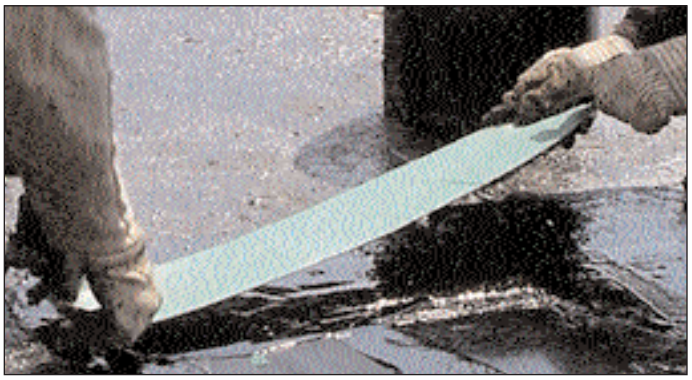
At all curbs, projections, walls and other changes in plane, hot rubberized asphalt bitumen and reinforced flashings should be installed prior to the field of the deck installation. Install base flashings in accordance with applicable flashing details and requirements. Install a flashing of Ram-Tough 250 and Ram Flash 327 HDR elastomeric sheeting wherever a vertical surface or change in plane (such as parapet wall, concrete column, etc.) exists. The minimum required height is 8 inches and the maximum is 30 inches. Consult Barrett Technical Services for heights in excess of 30 inches. Prime the area to the specified height and onto the deck; allow to dry tack-free. Use masking paper as required to avoid staining of adjacent surfaces. Take precautions to avoid wind-carried overspray from damaging adjacent surfaces. Bond laps in the sheet a minimum of 3 inches in width with 1/8 inch (125 mils) thickness of hot Ram- Tough 250. Apply 125 mils of Ram-Tough 250 a minimum of 4 inches in width to the horizontal plane and 8 inches on the vertical plane of the flashing and immediately lay the sheet into the material on the horizontal surface and embedded tight into the cove, following up the vertical surfaces and while the material is still hot. Sheeting must be fully adhered a minimum of 7 inches on the vertical and free of any wrinkles or fish-mouths and 100 percent tightly embedded. Use a hot roller or squeegee and apply a minimum 125 mils of Ram-Tough 250 over the entire assembly. The neoprene must be tightly pressed into the cove area. Neoprene flashing with void space below it is unaccepted and must be cut and re-flashed.

Install termination bar with appropriate fasteners on 8 inch centers. Seal the top edge of all flashings before the end of the day and provide metal counterflashing.

3. Cracks

Treat cracks less than 1/16 inch in width by priming the area with ram Primer/Surface Conditioner. As soon as the primer has dried tack-free, apply a 125 mil thickness of Ram-Tough 250, 6 inches from each side of the crack.

Treat cracks 1/16 inch to 1/4 inch in width by priming area with Ram Primer/Surface Conditioner. As soon as Ram Primer/Surface Conditioner has dried tack-free, apply 125 mil thickness of Ram-Tough 250 and embed a minimum 6 inch-wide Ram Flash 327 HDR elastomeric sheeting into hot Ram-Tough 250. The sheet must extend 3 inches to either side of crack and be free of fish-mouths. Lap separate lengths of Ram Flash 327 HDR sheeting a minimum of 3 inches and adhere with 90 mil thick hot Ram-Tough 250.



4. Cold Joints and Construction Joints

At cold joints and construction joints, remove any pre- molded joint filler to a minimum depth of 1/2 inch. Prime both sides of the joint with Ram Primer/Surface Conditioner and allow to dry tack-free. Apply 125 mil thickness of Ram-Tough 250 to each side of the joint, a minimum 9 inches in width. Immediately embed one half of a 6 inch width of Ram Flash 327 HDR while material is hot. Embed the other half of the sheet likewise on the other side of the joint. The sheet must be fully adhered and free of wrinkles and fish-mouths.

5. Expansion Joints

Applying Ram Primer/Surface Conditioner to the expansion joint area. Allow to dry tack-free. Select the Ram Flash 327 HDR elastomeric sheeting size that, upon final installation, will provide a minimum 12 inch width of sheeting bonded to each side of the joint. If necessary, join the lengths of sheeting to equal the length of the joint, allowing a minimum 6 inches for each end-lap in the sheets. Bond each end-lap in the sheet a minimum 6 inches in width, prior to installing in the joint. Bond the Ram Flash 327 HDR elastomeric sheeting with approved bonding adhesive or 125 mil thickness of hot Ram-Tough 250 to one side of the joint, a minimum 12 inches in width. Loop the sheet down into the joint to a depth equal to 1-1/2 times the joint opening at maximum anticipated movement, as indicated by the drawings. Bond the Ram Flash 327 HDR elastomeric sheeting likewise to the other side of the joint.

Coat the entire assembly with 125 mils of hot Ram-Tough 250 and fill the loop flush to the deck with Ram-Tough 250.

At the surface of the joint, install a closed-cell polyurethane foam rod, with a diameter, equal to the width of the joint opening. Install second sheet of Ram Flash 327 HDR over the foam rod being careful not to touch the foam rod with the hot Ram-Tough 250. The sheet should be loosely laid over the foam rod. Overcoat the flat portion of the neoprene; do not coat the bulb over the foam rod.

All expansion joints should be on raised curbs out of the drainage plane.

Always consult Barrett Technical Services for specific design requirements or questions concerning proper detailing.

SURFACE PREPARATION

1. Ram Primer/Surface Conditioner Application

Substrates must be free of dust, debris, rust, oil, laitance and other contaminants. Deck shall be cleaned with a powered blower or filtered air compressor just prior to applying Ram Primer/Surface Conditioner (CAUTION: Unfiltered air compressors often blow out oil and moisture condensation which will act as a bond breaker.) The use of power blowers or compressed air for cleaning must comply with current OSHA regulations.

Apply Ram Primer/Surface Conditioner at a rate of 200-600 square feet per gallon, depending on the roughness and porosity of the concrete. Ram Primer/Surface Conditioner can be sprayed. If spraying, utilize spray equipment that can deliver the desired application rate without thinning the product. Mask all adjoining surfaces and avoid overspray. Avoid high wind applications unless adequate precautions are instituted.

Apply Ram Primer/Surface Conditioner to all surfaces to receive Ram-Tough 250. Ram Primer/Surface Conditioner must be allowed to dry tack-free before applying the Ram-Tough 250. Drying time will vary depending on the temperature, wind and sunlight.

Ram Primer/Surface Conditioner should present a non-uniform mottled brown appearance. Do not prime more than will be covered in the same day. Re-prime all areas which have been contaminated by dust or debris.

2. MEMBRANE APPLICATION

The preparatory work to all surfaces, cracks, joints, flashings, etc., must be completed as specified and the primed areas must be allowed to dry to a tack-free condition before the Ram-Tough 250 membrane is installed.

Draw Ram-Tough 250 bitumen from the melter into hot pails or carts. Starting at the low point of the deck, pour the bitumen into place and spread evenly, at a thickness of not less than 90 mils., in a width of approximately 44 inches, with a straight blade squeegee. Do not use a serrated or notched blade squeegee. (90 mils equates to approximately 0.7lbs./sq.ft.)

To help assure the proper application rate, a chalk line grid system can be utilized to obtain the proper coverage.

(Due to irregular substrates, variations in ambient temperatures, material waste, experience of the applicator, etc., it is recommended that a total of two (2) lbs./sq.ft., for the 90 mil and 125 mil thick applications, be used for estimating purposes.The perfect surface, perfect application rate is 1.4lbs/sq.ft.)

To assure that proper bitumen application is being achieved on a consistent basis, it is highly recommended and specified that an adhesion and thickness test should be performed every hour.

ADHESION TESTING

The project Foreman should be physically checking adhesion once every hour, with a 2 inch by 3 inch coupon tab pull. Although there are several methods for testing membrane adhesion, the following process is simple and reliable. Allow the 90 mil base coat of RT 250 bitumen cool at the test location. Apply a 10” strip of common duct tape to the surface of the bitumen, Allow a 1 to 2 inch tab at one end loose to be used for the pull. Press the rest of the tape against the membrane. With the tape in place, get a secure grasp of the tab and pull it in the reverse direction. If the bitumen remains secure to the deck, sufficient adhesion has been obtained. If the bitumen separates from the deck, leaving exposed concrete, adhesion is not acceptable and Barrett should be contacted before proceeding with the membrane application. If the bitumen separates within itself cohesively that should not be an issue.

THICKNESS TESTING

To determine if the proper thickness is being obtained, check the mil thickness with a common mil gauge and record the location and results.

In cooler weather, the workability time frame will lessen in relationship to the air and deck temperature. Windy conditions will also accelerate the rate of bitumen cooling. Do not allow the material to cool before installation of the reinforcement fabric.

While the bitumen is still hot, install one (1) ply of Barrett Poly-Felt 125 VP reinforcement fabric into the Ram-Tough 250. Standing off to the side, using a broom or squeegee, press fabric into the hot bitumen using care not to create wrinkles or fish-mouths. If the sheet is not set straight and begins to run off a straight line, cut the roll and reset it, overlapping the end of the sheet by 6 inches.

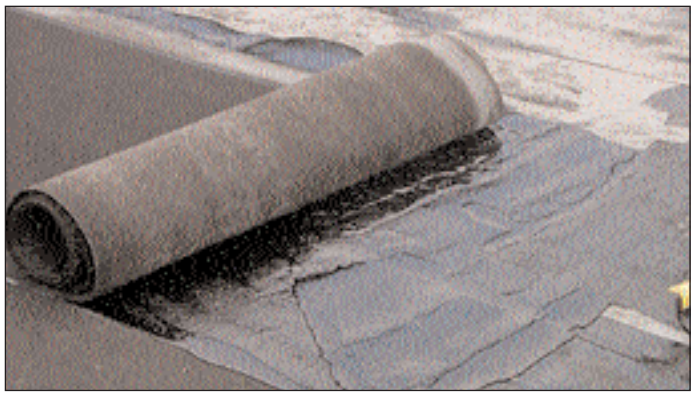
After the first run has been installed, return to the same starting point and install a second run of bitumen and reinforcement, overlapping the first course by 3 inches. All end laps shall be a minimum of six (6) inches. Ensure there is a solid coat of bitumen between all laps. **In no place shall fabric touch fabric**. All laps shall be laid in a fashion which allows the flow of water over or with the lap, not against it. Follow-up with successive plies, working up the slope.

After the base coat of bitumen and reinforcement have been completed, apply a top coat of Ram-Tough 250 applied at a thickness of not less than 125 mils. 125 mils equates to approximately 0.8lbs/100 sq. ft. While the surface coat is still hot, apply the specified protection course as follows.

If it is necessary to walk over the completed membrane prior to the installation of the protection course, use Barrett Roof Release agent spray to create a bond break.

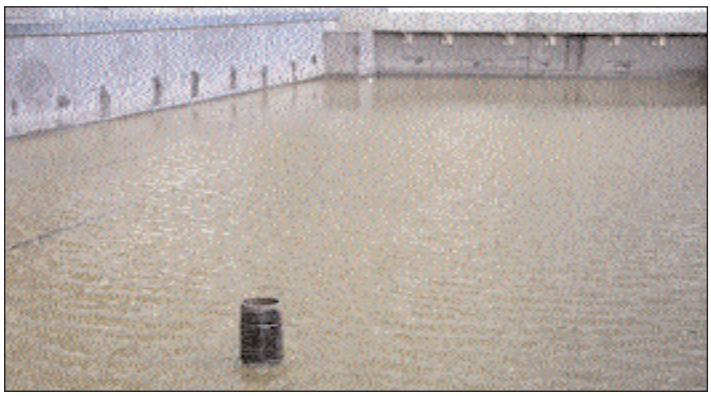
PROTECTION COURSE:

An approved protection course material such as Barrett Ram 200, Ram 203, Ram 201 or Ram 306 protection course shall be installed to provide protection of the membrane from placement of overburden and traffic by other trades. Start application at the drains and install so that water flows over or with the laps, never against them. Provide 2 inch side-laps and 6 inch end-laps. Butt joints are not acceptable. Use Ram-Tough 250 as adhesive as required. Provide bleed out of Ram-Tough 250 at all side laps.
Do not leave protection course exposed for more than 60 days.



WATER TESTING:

Completed membrane installation or sections should be flood tested in accordance with ASTM D-5957. The test period will be 48 hours, as required by the designer. Any leaks discovered shall be repaired and the area retested. This test is a requirement with most warranty applications. Some applications will require an Electronic Field Vector Mapping (EFVM) Test conducted by an approved surveyor. Vegetated roofs require EFVM testing.



WARRANTY INSPECTION

If the project requires a Barrett warranty. Barrett must be notified prior to the job start. Barrett must perform inspections of the application prior to the installation of the insulation or other overburden. Provide sufficient notice to allow scheduling a Barrett inspector. Any re-inspections required are chargeable to the contractor. Any questions please call Barrett Technical Services.

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