

GUIDE SPECIFICATIONS

**SECTION 07120
HOT POLYMERIC FLUID APPLIED WATERPROOFING
PROTECTED MEMBRANE ROOF SYSTEM
(STONE BALLASTED IRMA)
RAM-TOUGH 250 DM**

PART 1 - GENERAL

1.00 GENERAL

The general conditions, special conditions, applicable portions of Division 1 and requirements for general construction and substrates form part of this specification.

1.01 RELATED SECTIONS

- Section 02050 Demolition
- Section 04100 Masonry
- Section 06100 Carpentry
- Section 07220 Roof Insulation
- Section 07600 Sheet Metal
- Section 07710 Roofing Accessories
- Section 07900 Caulking & Sealants

1.02 SCOPE

The Work includes supplying all materials, labor and equipment to complete the installation of the Hot Polymeric Fluid Applied Double Membrane Waterproofing System for the following areas:

Concrete roof deck and elsewhere as shown.

1.03 QUALIFICATIONS

The roofing System shall be installed only by an Applicator approved and licensed by the Manufacturer with a minimum of five (5) years documented experience with the system specified herein. Polymerized bitumen and reinforcing sheets shall be supplied by the same firm to insure single-source responsibility. Materials supplied for installation may be tested by an independent laboratory to guarantee compliance with published physical properties.

The Manufacturer shall have a minimum of ten (10) years documented experience with the system specified herein.

1.04 SUBMITTALS

- A. Submit Manufacturer's written approval or license of Applicator for installation of the herein specified roofing System.
- B. Submit Manufacturer's sample Fifteen Year Labor and Material System Warranty and Manufacturer's Intent to Warranty Certification for this project.
- C. Submit most recent copy of Manufacturer's literature applicable to products and specifications to be used, as specified herein, including applicable flashing details.
- D. Submit three sheet samples, approximately 8 inches x 10 inches, of both roofing membrane reinforcement and flashing material.
- E. Submit three sample pints of elastomeric bitumen.
- F. Submit three samples, approximately 8 inches x 10 inches, of both roof deck insulation and filter fabric.
- G. Submit evidence of Manufacturers history of production for the system specified herein. A minimum of ten (10) years experience is required. Documentation shall include job lists with project size, Architect of record, installing Applicator, telephone numbers and contact names.
- H. Submit, in duplicate, certification from the primary Manufacturer, properly attested by a corporate officer, stating that all materials being supplied comply with the specifications and requirements of the contract documents, including conformance with all federal, state and local building codes including United States Code Section 41:10, Subsections a-d, popularly known as the "Buy American Act".

1.05 QUALITY ASSURANCE

All the materials specified herein are cited as a minimum standard of quality, and shall not preclude consideration of equal or superior materials. All suggested "equivalent materials" or other substitutions are to be submitted to the Architect for consideration a minimum of ten (10) days prior to the bid date. Submittal shall include all evidence of compliance or superiority of material from the proposed substitute Manufacturer. If accepted by the Architect, an addendum will be issued to all bidders for their consideration of the proposed substitute Manufacturer. Determination of equivalency of all substitutions shall rest exclusively with the Architect and such decision shall be final.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Deliver and store materials under provisions of General Conditions Section.
- B. Deliver material to jobsite on pallets. Package labels shall indicate material name, production date and product code.
- C. Store materials in dry, protected areas in an upright position. Control temperature of storage areas in accordance with Manufacturer's instructions. Protect moisture sensitive materials with breathable tarps on top and side surfaces.

1.07 PROJECT CONDITIONS

- A. Follow local, state and federal regulations, safety standards and codes. When a conflict exists use the stricter requirement.
- B. Do not apply roofing materials unless proper bitumen application temperatures (approximately 350°F-400°F) can be maintained, or when moisture in any form (i.e. rain, dew, ice, frost, snow, etc.) is present on the deck. Do not heat bitumen above 400°F.
- C. Ensure deck is structurally sound to support the live and dead load requirements of the roofing System and sufficiently rigid to support construction traffic.
- D. Sequencing and Scheduling: The Work shall be scheduled in the construction sequence so that designated complete contiguous areas can be installed and completed, including overlay wear courses, before other construction trades are allowed in the area. Prior to starting the Work, all drains shall be operative and all deck projections, sleeves and other penetrations shall be installed, in place and operative.

1.08 CODE COMPLIANCE

It shall be the Applicator's responsibility to ensure that all the Work done under this project shall be in compliance with applicable code requirements including obtaining any required permits prior to the start of the Work.

1.09 WARRANTY

Supplier of the roofing System shall furnish its standard Full System Fifteen Year Warranty for labor and materials on the deck, including the membrane, membrane flashing, insulation and ballast.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

The Barrett Company is set forth as the reference standard of quality. Other manufacturers equal or better quality may request approval in conformance with any specification requirements. Architect approved equal will be subject to all specification requirements.

2.02 MATERIALS

- A. Waterproofing Membrane:
 - 1. Hot Polymeric Waterproofing: **ram-Tough 250** SBS Kraton® modified bitumen shall have inert mineral stabilizer. Material shall comply with the following specifications:

<u>TEST</u>	<u>CGSB 37-GP-50M REQUIREMENTS</u>	<u>TYPICAL TEST RESULTS</u>
Flash Point, °C	Min. 260	327

Penetration, 0.1 mm	Max. 110 @ 25°C Max. 200 @ 50°C	83 165
Flow, mm	Max. 3	0.5
Toughness, J	Min. 5.5	11.7
Ratio of Toughness, J/N to Peak Load	Min. 0.040	0.059
Adhesion	Min. 1	1
Water Vapor Permeance ng/Pa.s.m ₂	Max. 1.7	0.39
Water Absorption, g	Loss 0.18 Gain 0.35	0.22+
Crack Bridging @ -25°C	No delamination No loss adhesion No cracking	No delamination No loss adhesion No cracking
Heat Stability @ 200°C Penetration, 0.1 mm	Max. 110 @ 25°C Max. 200 @ 50°C	80 155
Low Temp Flex @ -25°C	No delamination No loss adhesion No cracking	No delamination No loss adhesion No cracking
Viscosity, s @ 200°C	Min. 2 Max. 15	5

2. Uncured Neoprene Flashing Sheet: **ram Flash 327 HDR Sheet** shall comply with the following minimum specifications:

<u>TEST</u>	<u>METHOD</u>	<u>TYPICAL TEST RESULTS</u>
Thickness	ASTM D-412	60 MILS
Specific Gravity	ASTM D-297	1.48 ±.05
Tensile Strength min, psi (Mpa)	ASTM D-412	1500 (10.3)
Elongation, Ultimate min, %	ASTM D-412	250
Hardness, Curometer, A Tear Resistance min,	ASTM D-2240	60 ±10
Brittleness Temperature, max, F(deg C)	ASTM D-746	-30 (-34)
Flame Resistance	ASTM C-542	Must not propagate flame
Resistance to Heat Aging Properties after 70 h at 212 F Hardness increase max.	ASTM D-573	+ 10
Resistance to Oil Aging Change in Volume, max after 70 h Immersion in ASTM oil #3 at 212°F	ASTM D-471	+ 80%
Ozone Resistance Condition after Exposure	ASTM D-1149	No cracks

to 100 pphm ozone in Air for 100 h
at 104 F (sample under 20% strain)

Water Vapor Permeance (perms) ASTM E-96 .07

3. Ply Sheet: Poly-Felt 125 VP spunbonded polyester fabric, heat set with resin binder, shall comply with the following minimum specifications:

<u>TEST</u>	<u>METHOD</u>	<u>TYPICAL TEST RESULTS</u>
Basis Weight	ASTM D-3776	60 GR/M ²
Grab Tensile/lb	ASTM D-4830	34/lb. MD 32/lb. CD
Elongation/%	ASTM D-4830	37 MD, 42 CD
Trapezoid Tear/lb.	ASTM D-4830	14 MD 12 CD
Ames Thickness	ASTM D-1777	9.5 mils
Fatigue Life	ASTM D-8B	10,000 cycles

B. Related Materials:

1. Flashing Sheet for Exposed Conditions: ram Flash 306 SBS polyester reinforced sheet shall comply with ASTM D6164, Type I, Grade G.
2. Primer: ram Primer/Surface Conditioner, shall comply with ASTM D-41 requirements.
3. Pipe and Stack Flashing: 4 lb. lead or 16 oz. copper ram Pipe Boots and stack flashings supplied by primary materials Manufacturer and installed in accordance with published flashing details. Neoprene sheet is not acceptable at pipe and stack flashing.
4. Insulation: Roof insulation board shall be a dense, rigid, extruded polystyrene insulation, 2 inches thick, designed for Protected Membrane Roof (IRMA) application and approved by the membrane Manufacturer for system warranty. Insulation shall meet the following values:

<u>TEST</u>	<u>METHOD</u>	<u>TYPICAL TEST RESULTS</u>
Thermal Conductivity @ 75°F	ASTM C-518	0.20 K, R 5.0
Compressive Strength, min.	ASTM D-1621	40 lbs.
Flexural Strength, min.	ASTM C-203	60 lb/in
Water Absorption	ASTM C-272	0.1%
Water Vapor Permeance	ASTM E-96	.3-.8 perm

until these conditions have been corrected. Voids, cracks, holes and other damaged surfaces shall be repaired with materials compatible with **ram-Tough 250**. Concrete repairs shall be made with ChemRex, Inc. "EMACO T415 rapid strength repair mortar.

- C. Expansion Joints: Expansion joints shall be sharply formed and free of broken edges or loose aggregate and completely free of preformed joint fillers, sealants or back-up materials to a depth which is at least twice the width of the joint. Curb expansion joints at each side of the joint, either by integrally forming with the slab or securely fastening sulfate treated wood strips to deck. Chamfered edges at outside and inside corners.
- D. Verify application surfaces are properly cleaned, dry and reasonably smooth. Prepare other surfaces according to respective Manufacturer's instructions. Use cleaning materials and methods necessary to render an acceptable dust and rust free surface, including oil free filtered compressed air or high speed power blowers. Protect adjacent areas from damage with tarpaulin or other durable materials.
- E. No protection from the weather is necessary for **ram-Tough 250**, but temporary protection to installed membrane is required to prevent damage by mechanical gouging, scraping, spilling of oil and solvents or excessive heat.
- F. Delivery and Storage: Deliver and store materials undamaged in original containers with Manufacturer's labels and seals intact.

3.02 INSTALLATION

- A. Surface Conditioner: Each day, prior to application of **ram-Tough 250**, apply surface conditioner, as a fine spray at a rate of approximately 1 gallon per 300-600 square feet. Allow to dry completely tack free. Do not allow primed surface to be contaminated with construction debris or dust barrier. Re-prime and allow to dry as may be required by job conditions.
- B. Application: Units of **ram-Tough 250** shall be melted in an approved double-jacket oil bath melter under continuous agitation until the material can be drawn free-flowing and lump-free at a temperature of approx. 350°F - 400°F. The **ram-Tough 250** shall be applied at a rate to provide a continuous coating not less than 90 mils thick. Carry up all vertical wall surfaces a minimum of 8 inches unless otherwise shown or required by field conditions.
- C. Hot fluid applied **ram-Tough 250** shall be applied in a width exceeding the reinforcement fabric roll width. While **ram-Tough 250** is hot and tacky, install specified Poly-Felt 125 VP reinforcement, brooming in place from the side of the fabric. Side laps shall be a minimum of 2 inches with lap placement so water flows over them and not against them. All laps shall be sealed with hot **ram-Tough 250** under lap. In no place shall reinforcement touch reinforcement. End laps shall be 7 inches. Carry reinforcement up all vertical wall surfaces a minimum of 6 inches.

- D. After reinforcement fabric has been placed and broomed in, install second layer of **ram-Tough** 250, a minimum of 125 mils thick, at all points of the deck. Carry up vertical wall surfaces a minimum of 8 inches unless otherwise shown or required by field conditions. Do not leave any reinforcement fabric uncoated at end of day's work or in inclement weather.

3.03 FLASHING

Carry hot applied roof **ram-Tough** 250 and reinforcement up all junctions of horizontal deck and vertical surfaces, all changes of plane and all cold joints and cracks, as indicated on the drawings or as required by project conditions. At all parapets, walls, curbs, penetrations, drains, roof edges, etc., install **ram** Flash 327 HDR 60 mil neoprene flashing with hot fluid **ram-Tough** 250 over the reinforcement sheet as shown on the drawings, extending to top of the flashing. Mechanically fasten base flashings with 1/8 inch flat bar stock termination bar and fasteners approved for the substrate receiver. Overcoat the neoprene flashing with another 125 mil coat of the **ram-Tough** 250. All conditions that will be exposed after ballast installation shall be covered with **ram** Flash 306 granular SBS sheet in accordance with the Manufacturer's directions including mechanical fastening requirements.

Application width of neoprene flashing sheet shall be a minimum 6 inches total, minimum 3 inches in any single direction. Wider widths may be required as shown or by project conditions.

3.04 CRACK TREATMENT

At all cracks and construction joints, apply **ram-Tough** 250, 125 mils thick, then center a 6 inch wide strip of **ram** Flash 327 HDR neoprene flashing over the joint or crack and embed into the warm **ram-Tough** 250. Avoid air pockets. Allow assembly to cool. Reinforcement should be installed before the continuous, unbroken thick film of RAM TOUGH 250 and reinforcement felt is applied over the entire roof surface and flashing areas in accordance with Section 3.02.

3.05 EXPANSION JOINTS

Over expansion joints up to three inches in width with a designed total movement of 50% or less, **ram** Flash 327 HDR neoprene flashing shall be placed over the joint as shown on the drawings and embedded into a 125 mil thick coating of **ram-Tough** 250. The sheet shall be looped into the joint 1-1/2 times the joint width at maximum opening and extend 8 inches onto the deck on each side of the joint. The sheet shall be covered and the loop filled solid and flush with **ram-Tough** 250. Install 1-1/2 inch foam rod and second sheet of neoprene flashing looped over the foam rod. Extend sheet 12 inches onto the deck on each side of the joint. Overcoat flange on each side.

3.06 ROOF DRAINS

All roof drain sumps shall be set flush on concrete roof deck. Existing drains raised off of the deck shall be removed and replaced with new cast iron drain sumps, and new connections. All drain sumps shall be wire brushed free of rust, cleaned of all process oils, coated with specified primer and allowed to dry tack free. Install specified membrane system down into drain sump. Install 36 inch square piece of neoprene flashing over hot fluid membrane. Install clamping ring and cut out neoprene surplus from drain body. Overcoat neoprene sheet with 125 mil layer of hot fluid-applied membrane.

3.07 PITCH POCKETS AND UMBRELLAS

Pitch pockets, where required, shall be installed over the completed roof membrane. Flanges shall be primed and allowed to dry tack free and then strip flashed with an additional layer of polyester and two 125 mil layers of hot fluid applied membrane. Pitch pockets shall be filled flush to the top with hot fluid applied membrane. Install umbrella cover and stainless steel clamping ring and seal top of clamp ring with silicone sealant.

3.08 WATER TEST

Each contiguous area shall be water tested with 2 inches of standing water for a 24-hour period in accordance with ASTM D-5957. Provisions for overflow in event of rain shall be provided. Any area not passing water test shall be repaired and retested until watertight. Water test shall be witnessed and approved by the Architect and the Manufacturer providing the system warranty.

3.09 APPLICATION OF INSULATION AND BALLAST

Insure that membrane, flashing and other associated work is completed and water tested. Upon Architect's and Manufacturer's acceptance of the waterproof membrane, install polyethylene slip sheet and the insulation panels, progressing with both together. Lay insulation panels abutted tightly. The maximum acceptable opening between boards is 1/4 inch. Cover installed insulation with final layer of filter fabric covering and ballast in weights specified. Filter fabric shall turn up four inches at all projections and walls. Provide 8 inch side and end laps.

3.10 FIELD QUALITY CONTROL

- A. Adhesion Tests and Thickness Tests shall be monitored by Applicator every hour throughout the application process.
- B. Test Cuts shall be made at locations of Architect's or Manufacturer's request:
 - 1. Remove one 12 inch x 12 inch unsurfaced cut per 100 squares of deck area.
 - 2. Follow field audit criteria outlined by ASTM D-3617 Standards as applicable.
 - 3. Send roof cuts to: Structural Research Inc., Madison Wisconsin, or Manufacturer approved accredited laboratory for laboratory examinations. Applicator shall allow \$500.00 for testing fees per 100 squares of roof area. Laboratory reports shall be submitted by the laboratory directly to the Architect.
 - 4. Repair sampled areas by filling in the cut-out area then use a "feathered in" patch consisting of Poly•Felt 125 VP and **ram-Tough** 250 following the Manufacturer's and NRCA procedures.

MAINTENANCE:

Semi-annual inspections and a systematic maintenance program are recommended to the Owner and Architect. Consult your Barrett Representative, Barrett Tech Service at 800/647-0100 or Barrett Approved Applicator for further information.

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