



PERMA-SEAL INSULATION TECHNOLOGY

The most energy efficient roofing system under the sun.

Section 07 53 24

Fully Adhered SPUF/EPDM Roof -- TTR® Roof System

Part 1

GENERAL

A. SECTION INCLUDES:

1. Labour, products, equipment and services necessary for roofing in accordance with the Contract Documents
2. Materials and installation for ethylene propylene diene monomer (EPDM) roofing
3. Materials and installation for TTR Tri-Thermal Roofing spray-in-place polyurethane roofing foam insulation covered by a fully adhered EPDM membrane.

B. REFERENCES:

4. UL-790/ASTM E-108 Class A Fire Resistance Rating.
5. ASTM D4637 Standard Specification for EPDM Sheet Used in Single-Ply Roof Membrane.
6. 6. CGSB 37-GP-52M-1984, "Roofing and Waterproofing Membrane, Sheet Applied Elastomeric.
7. ULC/ORD-C790-4-1996 Roof Drains

C. TESTING METHODS:

8. ASTM D 1621: Standard Test Method for Compressive Properties Of Rigid Cellular Plastics,
9. ASTM D 1622: Standard Test Method for Apparent Density of Rigid Cellular Plastics;
10. ASTM D 2126: Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging;
11. ASTM D 2856: Standard Test Method for Open-Cell Content of Rigid Cellular Plastic by the Air Pycnometer;
12. ASTM E 96: Standard Test Methods for Water Vapor Transmission of Materials, Procedure A: desiccant method.

D. PRE-INSTALLATION MEETING

13. Prior to commencement of the work, the successful contractor is to attend a mandatory pre-construction meeting with the owner's representative. The contract documents, specifications, and scope of work shall be reviewed and confirmed

E. SUBMITTALS:

14. Product Data: Manufacturer's printed data sheets or catalogue pages describing the products to be incorporated into the roof, in accordance with Section [01 33 00 – Submittal Procedures].
15. Shop Drawings: In accordance with Section [01 33 00 – Submittal Procedures].
16. Material Safety Data Sheets: WHMIS MSDS in accordance with Section [02 61 33 – Hazardous Materials.
17. Manufacturer's Instructions: Indicate special handling criteria, installation sequence, cleaning procedures
18. Maintenance Data: Sample Annual Inspection and Report forms.
19. Warranty: Sample __YEAR Warranty Certificate.



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F. QUALITY ASSURANCE:

20. Regulatory Requirements: Comply with Department of Labour and Occupational Health and Safety Act.
21. Installer Qualifications: Use adequate numbers of skilled, qualified personnel thoroughly trained and completely familiar with the specified requirements and methods needed for proper performance of the work of this Section.

G. DELIVERY STORAGE AND HANDLING

1. Deliver, handle, store and protect materials in accordance with Section [01 51 00 – Common Product Requirements].
2. Provide and maintain dry, off-ground weatherproof storage.
3. Store materials on supports to prevent deformation
4. Remove only in quantities required for same day use.
5. Store uncured flashing and jointing materials to prevent premature curing and freezing.
6. Store roofing materials in accordance with manufacturer's written instructions.

H. WASTE MANAGEMENT AND DISPOSAL

1. Separate and recycle waste materials in accordance with construction/demolition waste management and disposal practices.
2. Remove from site and dispose of packaging materials at appropriate recycling facilities
3. Fold up metal banding, flatten and place in designated area for recycling.
4. Dispose of waste foam daily in location designated by [Consultant] [Architect] [Engineer] and decontaminate empty drums in accordance with foam manufacturer's instructions.
5. Divert metal drums from landfill to metal recycling facility as approved by [Consultant] [Architect] [Engineer].
6. Unused adhesive and sealant materials must not be disposed of into sewer system, into streams, lakes, onto ground or in other location where they will pose health or environmental hazard. Divert unused materials to municipal hazardous materials depot approved by [Consultant] [Architect] [Engineer].
7. Divert wood materials from landfill to [recycling] [reuse] [composting] facility approved by [Consultant] [Architect] [Engineer]
8. Collect, package and store EPDM membrane cut-offs and waste material for recycling and return to recycler in accordance with waste management practices.
- 9.

I. SITE CONDITIONS: Ambient Conditions:

1. Apply polyurethane insulation and EPDM membrane only when surfaces and ambient temperatures are within manufacturer's prescribed limits.
2. Do not install EPDM membrane when air and substrate temperature remain below [5 degrees C (40° F)] causing condensation in accordance with manufacturer's recommendations or when wind chill gives equivalent cooling effect causing condensation.
3. Install EPDM membrane on dry substrate, free of water, snow and ice. Use only dry materials and apply only during weather that will not introduce moisture into system.



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J. WARRANTY:

1. Warrant EPDM membrane and flashings will stay in place and remain leak-proof for a period of [10] [20] years in accordance with roofing system contractor's standard Warranty. Include annual inspection service with Warranty.
2. Warranty to be subject to annual inspection by roofing system contractor at no additional cost as per Annual Inspection Check List & Report forms referenced in 1.4 Submittals.

Part 2: MATERIAL

MANUFACTURER

Acceptable roofing system manufacturer:

TTR Roofing International, Inc. 5317 -#49 Fruitville RD, Sarasota 34232 Toll Free: 1-844-344-9989

Email: support@ttrsistemas.com or info@ttrsistemas.com Web: www.ttrsistemas.com

A. Polyurethane insulation:

HFC blown (zero-ozone depleting) liquid spray monolithic system, medium density rigid polyurethane insulation with R7.1 per square foot per inch, Class A Fire Tested rating to UL790/ASTM E108. Acceptable TTR Spray applied Polyurethane Roofing Foam.

B. Membrane adhesive:

TTR Tri-Thermal Roofing's TTR007G Adhesive, two-part spray applied polyurethane adhesive, containing no VOC's, CFC's or HCFC's, 12 mm (1/4 -1/2" thickness)

C. Membrane:

Non-reinforced black or white colored EPDM (Ethylene Propylene Diene Monomer) cured, single ply membrane, (1.5 mm thickness), 30.5 long rolls x 3m widths up to 30.5 long rolls x 9.14m widths. Membrane to meet or exceed the minimum requirements set forth by ASTM D4637 and CGSB 37-GP52M for Class 1, Class A non-reinforced EPDM single ply roofing membrane. Acceptable Material: Firestone

D. Seam Tape:

Splice tape, 76.2mm wide x 30.5 m rolls x 0.77mm thickness, black or whole colored rubber polymer base. Acceptable Material: Firestone QuickSeam

E. Elastomeric U.V. protection:

Elastomeric coating, Silicone Coating or Polyurea Coating

F. Cap Flashing:

24 gauge galvanized steel

G. Cap Flashing Fastener: 25.4 mm galvanized self tapping screws fitted with rubber grommet.

H. Roof Drains:

One-piece seamless body of 3 mm (.125", 11 gauge) spun aluminum, extra large 445 mm (17-1/2") deck flange, cast aluminum strainer dome and clamping ring, 305 mm (12") long drain stem, U-Flow Seal, [75 mm (3")] [100 mm (4")] [125 mm (5")] [150 mm (6")] diameter, to ANSI/SPRI RD-1 and ULC/ORD-790.4. Acceptable Material: Hercules Classic drain



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Part 3: EXECUTION

A. PREPARATION:

Clean roof surfaces receiving polyurethane foam insulation by sweeping, power washing or dry/wet vac.

Prior to beginning work, ensure:

1. Substrates are firm, straight, smooth, dry, free of water, snow, ice or frost, and swept or vacuumed clean of dust and debris.
2. Curbs have been built.
3. Drains have been installed at proper elevations relative to finished surfaces.
4. Plywood and lumber nailer plates have been installed to walls and parapets as indicated.

Remove wet areas and ensure deck surfaces.

5. Remove wet areas and ensure deck surfaces are dry before introducing new insulation to level of removed areas.

B. SAFETY REQUIREMENTS:

1. Protect workers as recommended by polyurethane foam and membrane manufacturers.
2. Ensure workers wear gloves, respirators, dust masks, long-sleeve clothing, eye protection and protective clothing when applying foam insulation
3. Do not permit workers to eat, drink or smoke while applying foam insulating and adhesive.
4. Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage and disposal of insulation, adhesive, sealing tape and membrane.

C. APPLICATION:

POLYURETHANE FOAM INSULATION:

1. Using foam insulation, build up low areas to reduce or eliminate ponding and to create uniform surface for receiving membrane. Up to 38 mm (1/2") only depth of ponding will be acceptable after a rainfall.
2. Use transit level to ensure positive drainage slope from roof perimeter to drain locations.
3. Build foam up around pipes and curbs to shed water away from roof protrusions.
4. Protect adjacent surfaces and equipment from damage by over-spray and dusting of insulation material.
5. Apply foam 38 mm to 50 mm (1" to 3+") thickness and allow approximately 45 minutes to off-gas and cure sufficiently, before applying membrane adhesive.

EPDM:

1. Position membrane over insulation starting at highest point and allow membrane to relax for 1/2 hour.
2. Overlap sheets minimum 75 mm (4') at both side laps and end laps.
3. Fold back EPDM membrane to expose polyurethane foam
4. Spray on slow acting urethane adhesive over surface of cured polyurethane insulation just prior to applying membrane.



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5. Apply foam adhesive 6 mm (1/4") thickness to ensure any indentations in the insulation are filled while permitting the EPDM to be fully adhered to the insulation.
6. If necessary, use wind screens and avoid overspray when applying adhesive.
7. Pull membrane into urethane adhesive and ensure membrane is placed within 10 minutes of urethane adhesive being sprayed onto polyurethane foam insulation.
8. Roll or broom membrane from centre of sheet in direction of roll to ensure adhesive contact is made between rubber and foam insulation, and to minimize or eliminate wrinkles in membrane.
- 9a At protrusions, install necessary Epdm detail terminations to make protrusions watertight as per manufacturer. 9b. Alternative:At protrusions, seal membranes at base of protrusion using EPDM seam tape and cover with second application of polyurethane foam to a height of 200 mm (8") up protrusion. Spray elastomeric U.V. protective coating over exposed foam insulation at rate recommended by manufacturer.
10. Apply 75 mm (3") wide EPDM seam tape to membrane overlaps using solvent adhesive.
11. Apply roofing in sections and seal at end of day to protect against any overnight rainfall.

NEW DRAIN/ INSERTS

1. Fit new drain or inserts to original drain locations to facilitate drainage.
2. Apply water block or mastic to stem and base of drain to seal drain insert. Use one (1) tube of water block or mastic for each [250 mm (10")] drain insert.
3. Install sealing ring gasket or similar to bottom of drain stem to seal stem to rainwater leader and to prevent back-up of water into ceiling spaces in the event of a plugged drain.
4. Install 3" seam tape to drain flange using adhesive to ensure adhesion and seal made to drain flange while installing spray applied polyurethane foam.
5. Install additional roof drain(s) at low spots where indicated on roof plan, if necessary.
6. Upon completion of EPDM membrane install clamping ring on drain- apply water block mastic bead to both underside and topside of membrane under clamping ring and install.

CAP FLASHINGS

1. At roof edge or curbs, carry membrane over roof eave and cover with metal cap flashing. Secure cap flashing with precoated screw fasteners at 610 mm (24") centres and as shown on engineering drawings.

CLEANING

1. Clean Work in accordance with Section [01 74 11 – Cleaning].
2. Check drains to ensure proper function, and remove debris, equipment and excess material from site.

END OF SECTION