SECTION 070153 - EPDM ROOFING REPAIR

Use this section when designing repairs on an existing non-warrantied adhered epdm roof system. When designing repairs on a warrantied roof system, use Section 070150, “Modifications To Existing Warrantied Roof”. A nondestructive moisture survey is recommended to determine if insulation is wet. The wet insulation needs to be cut out and replaced with insulation to match type and thickness before completing membrane repairs. It is very important to examine the roof deck; especially metal deck to determine if there is damage to the deck that requires repair.

Revise this Section by deleting and inserting text to meet Project-specific requirements.

This Section uses the term "Director’s Representative." Change this term to match that used to identify the design professional as defined in the General and Supplementary Conditions.

Verify that Section titles referenced in this Section are correct for this Project's Specifications; Section titles may have changed.

1. GENERAL
	* + 1. RELATED DOCUMENTS

Retain or delete this article in all Sections of Project Manual.

* + - * 1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
			1. SUMMARY
				1. Section Includes:

Methods and procedures for repairing EPDM roofing.

* + - 1. SUBMITTALS
				1. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
				2. Manufacturer’s installation instructions shall be provided along with product data.
				3. Submittals shall be provided in the order in which they are specified and tabbed (for combined submittals).
				4. Product Data: Catalog sheets, specifications, installation instructions for each material specified.
				5. Quality Control Submittals:
				6. Membrane Manufacturer’s Certification: Written certification that the manufacturer has been actively marketing the submitted system for the past 5 years.

Installer’s Certification: Written certification from the membrane manufacturer certifying that the installer is licensed or approved to install the roof system.

Product Data: Catalog sheets, specifications, installation instructions for each material specified.

Material Safety Data Sheets (MSDS): Do not include the MSDS in the Submittals Package. Submit the MSDS to the Director’s Representative if requested.

* + - * 1. Samples:

Sheet Membrane: One 6 inch square piece.

Sheet Flashing: One 6 inch square piece.

EPDM Cover Tape: One 12 inch square piece.

Inseam Tape: One piece 3 inches wide by 12 inches long.

Fasteners: Two each type.

Insulation: One 3 inch square piece.

Coverboard: One 3 inch square piece.

Delete subparagraph below if barrier board is not specified in part 2.

Underlayment Board: One 3 inch square piece.

* + - * 1. Submit items, except contract closeout submittals and MSDS, at one time as a complete package. Partial submittals will not be considered.
			1. QUALITY ASSURANCE
				1. Fire Hazard Classification: The sheet membrane roof system shall have an Underwriters Laboratories Class A or B External Fire Resistance rating, as determined by tests conducted in conformity with UL-790 “Tests for Fire Resistance of Roof Covering Materials”.
				2. Material Classification Identification: Materials delivered to the site that are a component of the roofing system shall bear the UL Classification mark.
				3. Membrane Manufacturer’s Qualifications:

The manufacturer shall have been actively marketing an EPDM roof system in the United States for a minimum of 5 years.

The manufacturer shall have the technical expertise and qualified technical representatives to resolve questions or problems that may arise both during and after the Work is completed.

The manufacturer shall require that the roof system be installed by a licensed or approved applicator.

* + - * 1. Installer’s Qualifications: The installation of the roofing system shall be performed by an installer licensed or approved by the membrane manufacturer. The installer shall have previously installed at least 3 EPDM sheet membrane systems for which the manufacturer’s warranty was issued.

Workers: The supervisor or crew chief and at least one other member of the roofing crew shall have installed at least 3 EPDM sheet membrane roof systems and shall be thoroughly familiar with all aspects of the installation.

* + - 1. DELIVERY, STORAGE, AND HANDLING
				1. Delivery: Deliver materials to the site in the manufacturer’s labeled, unbroken containers.
				2. Storage and Handling: Store materials in a dry, well-ventilated place protected from the weather.

Do not store materials so as to overload the deck or structural assembly.

Store materials on raised platforms covered with properly secured breathable water resistant covers. Slit shrink wrapping to not permit condensation and cover with breathable tarp.

Store volatile liquids in a separate storage building or trailer, or removed from the site at the end of each workday.

Store volatile liquids at temperatures recommended by the manufacturer.

Do not remove materials from factory packaging until ready for use.

Store adhesives, and sealants at temperatures between 60 degrees F and 80 degrees F.

* + - 1. PROJECT CONDITIONS
				1. Unless otherwise directed, do not execute the work of this Section if the Director’s Representative is not present.
				2. Do not execute the work of this Section unless the repair area substrate is dry and free of dirt and debris.
				3. Moisture Protection:

Cover, seal or otherwise protect the roof and flashings so that water cannot accumulate or flow under completed portions. When and where necessary to accomplish this, provide temporary water cut-offs in accordance with the membrane manufacturer’s written specifications.

Limit the removal of existing materials to areas that can be completely repaired or temporarily protected within the same day. At the discretion of the Director’s Representative, a watertight built-up vapor barrier may be acceptable temporary protection for a maximum of 48 hours.

* + - * 1. Do not smoke or use open flames near volatile materials.
1. PRODUCTS
	* + 1. MATERIALS
				1. The EPDM sheet membrane shall be visually free of streaks, particles of foreign matter, undispersed raw material, pinholes, cracks, tears, and shall be uniform in thickness. When unrolled in a relaxed position, the membrane shall be free of wrinkles, distortions, and blisters.

Edit subparagraph below to match the mil thickness of the membrane required. 60 mil is the standard thickness, but 45 mil or 90 mil are also utilized.

* + - * 1. EPDM (Ethylene, Propylene, Diene, Monomer) Sheet Membrane:

One of the following types as required to achieve a UL Class A or B external fire rating:

60 mil, fire retardant, unreinforced, EPDM membrane.

60 mil, unreinforced, EPDM membrane.

60 mil, fire retardant, reinforced, EPDM membrane.

60 mil, reinforced, EPDM membrane.

* + - * 1. Sheet Flashing: Membrane manufacturer’s cured and uncured EPDM as specified.
				2. Inseam Tape: Membrane manufacturer’s minimum 3 inch wide self adhering tape consisting of cured butyl double sided adhesive tape, for inseam splicing of rubber to rubber.
				3. Cured EPDM Cover Tape: Membrane manufacturer’s minimum 5 inch wide self adhering tape consisting of cured butyl adhesive laminated to cured EPDM, for installation over EPDM seams, cuts in field membrane, and for stripping in metal work.
				4. Uncured EPDM Cover Tape: Membrane manufacturer’s minimum 5 inch wide self adhesive tape, consisting of, cured butyl adhesive laminated to uncured EPDM, for installation over base flashing corners, inside and outside corners, pipe flashings and other detail work.
				5. Related Products: Membrane manufacturer’s bonding adhesive, splicing cement, lap sealant, water cut-off mastic, nite seal, pourable sealer, splice joint cleaning agent and primer, insulation adhesive, and all other products related to the sheet membrane system.
			1. INSULATION

Indicate insulation thicknesses on drawings.

ASTM C1289: The materials are classified as follows: Types I, II, III, IV, and V. Under Type I are Classes 1 and 2. Under Type II are Classes 1, 2, and 3. Under Type II Class 1 are Grades 1, 2, and 3.

* + - * 1. Uniform Thickness isocyanurate insulation and Tapered isocyanurate insulation: Approved closed cell isocyanurate foam core insulation skinned on both sides with factory applied fiberglass facers suitable for installation with hot asphalt and cold adhesive. ASTM C1289, Type II, Class 1, Grade 2. UL Classified and Factory Mutual Approved for direct application over steel deck. Minimum LTTR: 6.0 per inch thickness. Match existing thickness.

Adhesively Secured Insulation: Maximum board size 4 feet x 4 feet.

Mechanically Fastened Insulation: Minimum board size 4 feet x 8 feet.

Use paragraph below when tapered insulation is shown on the drawings. Available in 1/16 to 1/2 inch pitch per foot slope.

* + - * 1. Tapered Insulation System: Membrane manufacturer’s approved factory tapered polyisocyanurate insulation to match existing taper.

Select one of the two paragraphs below to match coverboard on existing roof system. Coverboard insulation is available in ¼ and ½ inch thicknesses.

* + - * 1. Coverboard Insulation: Match existing thickness with gypsum roof board composed of a silicone treated gypsum core with fiberglass facers.

Acceptable Product:

“DensDeck Roof Board” by Georgia-Pacific Corporation, [www.gp.com](http://www.gp.com)

Approved equivalent.

Adhesively Attached Board: Maximum board size 4 feet x 4 feet.

Mechanically Attached Board: Minimum board size 4 feet x 8 feet.

C 208: Insulating board covered by this specification consists of six types: Types I, II (Grades 1 and 2), III (Grades 1 and 2), IV (Grades 1 and 2), V, and VI

* + - * 1. Coverboard Insulation: Membrane manufacturer’s approved asphalt impregnated cellulosic wood fiber insulation conforming to ASTM C 208.

Thickness: Match Existing Thickness.

Minimum R value: 2.05 per inch.

Use paragraph below when crickets are shown on the drawing.

* + - * 1. Tapered Cricket System: Membrane manufacturer’s approved asphalt impregnated 1/2 inch per foot factory tapered wood fiberboard insulation conforming to ASTM C 208.

Use paragraph below with tapered insulation, at roof drain sumps, and at raised gravel stops.

* + - * 1. Tapered Edge Strips: Approved asphalt impregnated 1/2 inch per foot factory tapered wood fiberboard insulation conforming to ASTM C 208.

Use article below on all combustible decks, when using a vapor barrier on combustible decks. Barrier board is also available in 1/2 inch thickness. 1/2 inch should be specified for wide fluted metal decks.

* + - 1. UNDERLAYMENT BOARD
				1. Underlayment Board: Gypsum roof board composed of a silicone treated gypsum core with fiberglass facers. Match existing thickness.

Acceptable Product:

“DensDeck Roof Board” by Georgia-Pacific Corporation, [www.gp.com](http://www.gp.com).

Approved equivalent.

Adhesively Attached Board: Maximum board size 4 feet x 4 feet.

Mechanically Attached Board: Minimum board size 4 feet x 8 feet.

* + - 1. FASTENERS

Delete paragraph below if insulation and membrane are adhered. Edit if fasteners are used for either insulation or membrane installation. Edit for type of deck.

* + - * 1. Insulation and Membrane Fasteners: Provide fasteners that are approved for use with the existing roof system.

Steel and Wood Decks: Membrane manufacturer and Factory Mutual approved, hardened, self-tapping, anti-backout, Phillips pan head screws with round, square or hexagonal steel stress plates. Plate size as recommended by the manufacturer.

Steel Decks: Minimum penetration 1/2 inch, minimum pull out resistance from deck 400 pounds unless specified otherwise by the membrane manufacturer.

Wood Decks: Minimum penetration one inch, minimum pull out resistance from deck 360 pounds unless specified otherwise by the membrane manufacturer.

Concrete Decks: Membrane manufacturer and Factory Mutual approved; hardened, self-tapping, anti-backout, Phillips pan head screws with round, square or hexagonal steel stress plates; or hammer driven spikes with deformed shanks and round, square, or hexagonal steel stress plates. Plate size as recommended by the membrane manufacturer.

Minimum penetration 1-1/4 inch, minimum pull out resistance from deck 400 pounds unless specified otherwise by the membrane manufacturer.

Edit subparagraph below for the type of deck.

Structural Wood Fiber Decks/Gypsum Decks/Lightweight Concrete Decks: Membrane manufacturer and Factory Mutual approved, non-metallic, anti-backout, reinforced polymer auger fastener with round, square or hexagonal steel stress plates.

Penetration Into Deck: Minimum 1-1/2 inches.

Select subparagraphs below for type of deck.

Structural Wood Fiber Decks: Minimum pullout resistance 300 pounds.

Lightweight Concrete Decks and Gypsum Decks: Minimum pullout resistance 350 pounds.

Use paragraph below with all cap flashings, except with surface mounted caps or compression bars.

* + - * 1. Base Flashing Fasteners (use along top edge of base, beneath in-wall cap flashings):

Concrete and/or Masonry Surfaces: Hardened masonry nails or zinc alloy hammer driven expansion anchors with stainless steel drive pins through 1 inch minimum sheet metal discs.

Sheet Metal Surfaces: Hardened, self tapping, #10 sheet metal screws through 1 inch minimum sheet metal discs.

Wood Surfaces: Hot dipped galvanized roofing nails with minimum 3/8 inch diameter head.

Use paragraph below if cap flashings are not being used. Coordinate with drawings.

* + - * 1. Termination Bar and Fasteners:

Termination Bar: Factory fabricated one inch wide x .100 inches thick, mill finish aluminum bar, with 1/4 inch x 3/8 inch slotted holes 8 inches on center and with a 1/4-inch wide 35 degree caulking and stiffener flange.

Acceptable Products:

“TB100-8 Termination Bar” by TruFast Corporation, [www.trufast.com](http://www.trufast.com).

Approved equivalent.

Fasteners:

Concrete Or Masonry Surfaces: Slotted hex washer head masonry screws or zinc alloy hammer driven expansion anchors. Length as required to securely hold the compression bar tight against the wall surface.

Wood and Sheet Metal Surfaces: Hardened, self-tapping, slotted hex washer head screws.

Use paragraph below at bases of curbs, walls, etc.

* + - * 1. EPDM Anchor Strips: 6 inch wide reinforced EPDM.

Use article below when using asphalt to adhere insulation and/or to repair asphalt vapor barrier.

* + - 1. BITUMEN

Info: Asphalts shall be classified as: Type I; Type II; Type III; and Type IV. Type III is an oxidized bitumen intended for use with glass felts, modified rolls, insulation and cover boards with a slope of 0-3:12 (0-25%).

* + - * 1. Bitumen: Steep asphalt; ASTM D 312, Type III.

Use article below when using adhesive to adhere insulation.

* + - 1. INSULATION ADHESIVE
				1. Insulation Adhesive: Low-rise polyurethane foam adhesive, or the manufacturer’s recommended insulation adhesive.

Acceptable Products:

OlyBond 500 Adhesive Fastener, by OMG Roofing Products, [www.olyfast.com](http://www.olyfast.com).

Millennium One Step Foamable Adhesive by CertainTeed, [www.certainteed.com](http://www.certainteed.com).

Approved equivalent.

* + - 1. MISCELLANEOUS MATERIALS
				1. Pipe Flashing: Cured premolded EPDM pipe boot.

Use paragraph below for flashing round penetrations.

* + - * 1. Compression Clamp: Stainless steel or cadmium plated steel worm drive clamp.

It is preferable to use existing drains and clamping ring. Use paragraph below on reroofing projects if there is a need for retrofits

* + - * 1. Retro-Fit Roof Drains: Metal or plastic roof drains designed specifically for installation into an existing roof drain and conductor pipe. The drain shall be formed with an expandable drop tube or with an expandable rubber boot to form a watertight seal between the drop tube and the existing conductor pipe. The drain shall also have a large flashing flange, clamping ring and an aluminum strainer.

Acceptable Products:

“Proliner Roof Drain” by Marathon Roofing Products, www.marathondrains.com.

“Hercules Roof Drain” by OMG Roofing Products, www.olyfast.com.

“Reroof Drain” by Portals Plus, Inc., [www.portalsplus.com](http://www.portalsplus.com).

Approved equivalent.

Use paragraph below only if there are pitch pocket repairs.

* + - * 1. Pitch Pocket Filler Material:

Mortar: ASTM C 270, Type S.

Pourable Sealer: Membrane manufacturer’s 2 component liquid urethane.

Use paragraph below only for termination bar when no cap flashing is used.

* + - * 1. Sealant: One-part, low modulus, silicone sealant:

Acceptable Products:

Dowsil 790 Silicone Building Sealant

GE Silicones SCS2000 SilPruf Sealant

Pecora 864NST

Tremco Spectrem 1

Approved equivalent.

Use paragraph below if special color of finished roofing system is desired. Coordinate with drawings and roofing coordination. White EPDM is also available.

* + - * 1. Color Coating: Hypalon or acrylic coating as recommended and approved by the membrane manufacturer.

Color: White.

Use paragraph below on ballasted EPDM roof system.

* + - 1. UNDERLAYMENTS
				1. Ballast Underlayment:

Polyester or polypropylene non-woven water pervious fabric, 12 ft wide, weighing a minimum of 5 oz/sq yd.

Acceptable Product:

“Sure-Seal EPDM HP Protective Mat” by Carlisle SynTec, [www.carlislesyntec.com](http://www.carlislesyntec.com)

Approved equivalent.

* + - 1. `MATERIALS FOR VAPOR BARRIER REPAIR

Use below to repair existing vapor barrier

* + - * 1. Materials For Repair Of Existing Vapor Barrier:

Primer: Quick drying asphalt primer; ASTM D 41.

Asphalt Fiberglass Base Sheet: Nonporous asphalt coated glass fiber base sheet: ASTM D 4601, Type II.

Plastic Roof Cement: Non-asbestos bearing, fibrous, flashing grade; ASTM D 4586.

Bitumen: Steep asphalt; ASTM D 312, Type III.

Interply Adhesive: Membrane manufacturers cold process solvent based modified adhesive.

Asphalt content: 42 percent ASTM D 4479

Density: 8 lbs/gal ASTM D 1475

1. EXECUTION
	* + 1. SURFACE PREPARATION
				1. Cleaning: Before the roofing repair commences, sweep and/or vacuum surfaces to remove ballast, dirt, dust, loose aggregate, foreign matter, and debris from repair area, a minimum 6 inches beyond where the perimeter of the patch will extend. Scrub area of membrane with a solution of detergent and water such as Spic ‘n Span or other detergent containing trisodium phosphate. Use warm water and a stiff bristle brush to scrub the membrane. Rinse thoroughly with clean water and allow membrane to dry. A rubber bladed squeegee and clean, absorbent, lint-free cloths may be used to facilitate drying. Dirt must be removed from area to be patched.
				2. Ensure roof drain strainers are in place and secured during removal of insulation and other debris. Provide cast iron strainers where existing strainers are missing. Do not allow debris to enter drains.
			2. INSTALLING INFILL INSULATION
				1. Keep insulation dry. Discard insulation that contains moisture.
				2. Install only as much insulation as can be covered with roofing membrane the same day.
				3. Discard units with broken corners or similar defects.
				4. At roof drains, terminate the insulation with tapered edge strips so that flashing and coverstrip joint laps can be made within the tapered portion.
				5. Cut back the membrane at affected area to expose the insulation. Remove fasteners holding the insulation, if present. Cut the insulation and discard properly, taking care not to damage vapor barrier, if present.

Select one of the three paragraphs below in accordance with application method.

* + - * 1. Installing Mechanically Attached Insulation: Mechanically attach insulation in accordance with FM Loss prevention Data 1-28 including enhanced perimeter and corner fastener spacing. Set the fasteners with enough force to hold the insulation firmly against the deck surface. Do not allow the fastener to crush the insulation. Check each fastener to ensure that it is securely anchored to the deck. Remove loose or defective fasteners.

Use subparagraph below on concrete and gypsum decks.

Before installing the fasteners, predrill the correct size hole as recommended by the fastener manufacturer through the insulation and into the deck. Drill the hole 1/2 inch deeper than the fastener penetration.

* + - * 1. Installing Insulation with Asphalt: Set insulation boards, in a full hot mopping of Type III steep asphalt applied at the rate of 30 pounds per square. Press insulation into the bitumen to a firm and uniform bearing.
				2. Installing Adhesively Secured Insulation: Set each board in insulation adhesive applied in accordance with manufacturer’s current printed instructions. Press insulation into the adhesive immediately and as necessary thereafter to assure proper bonding. Maintain pressure on the adhesive until the adhesive has completely set (20 to 45 minutes).
				3. Installing Insulation Board: Install each layer of insulation with joints staggered. Butt edges and ends snugly so there are no gaps between the insulation boards. Discard boards with broken corners and boards that are warped.
				4. Installing Tapered Insulation System: Install the tapered insulation to match the existing tapered insulation system. Install each layer of insulation with joints staggered. Butt edges and ends snugly so that there are no gaps between the insulation boards.

Use below when coverboard is specified in Part 2.

* + - * 1. Install coverboard insulation over the polyisocyanurate insulation.
			1. MEMBRANE PREPARATION
				1. Preparing Existing Roof Membrane:

Use below to repair splits, cuts, seams, etc.

Cut the membrane a short distance from and parallel with the perimeter, base of the wall, curb or termination point to relieve the tension. Allow the membrane to relax for a minimum of 30 minutes.

Use below to repair membrane shrinkage.

Cut the membrane a short distance from and parallel with the perimeter, base of the wall, curb or termination point to relieve the tension. Allow the membrane to relax for a minimum of 30 minutes.

Secure the existing membrane to the deck or base of the wall by mechanically fastening with metal batten bars or plates and fasteners, or as directed by the membrane manufacturer.

Thoroughly clean the surface of the membrane area to be repaired and backside of the patch material of the patch material with a clean, absorbent, lint-free cloth and an acceptable solvent cleaner as prescribed by the membrane manufacturer. If the membrane manufacturer cannot be identified, other solvents such as Heptane, unleaded gasoline or Xylene may be used. Turn the cloth frequently and replace when dirty to prevent dirt and contaminants from being scrubbed into the membrane. Allow the solvent-wash to thoroughly flash-off and dry.

* + - 1. INSTALLING EPDM REPAIR MEMBRANE
				1. Cut a piece of like membrane large enough to extend 4 inches beyond any part of the cut and to provide an expansion fold of 4 to 6 inches. Round the corners of the patch to prevent peeling of square corners.

Apply primer to both surfaces to be mated and allow to dry.

If the existing membrane surface is excessively degraded, insert the new patch material under the existing membrane so that adhering of the patch may be accomplished to the underside of the existing membrane.

* + - * 1. Adhering Roofing Membrane To The Substrate:

Adhere the roofing membrane to the substrate bonding adhesive. Mating surfaces must be clean and dry before adhering the membrane.

Apply a uniform coating of bonding adhesive to both mating surfaces at the rate recommended by the manufacturer. Do not leave “skips” or “holidays”. Do not allow the bonding adhesive to puddle.

Do not allow bonding adhesive to contact areas to be spliced.

Allow the adhesive to dry until it does not stick to the dry finger touch. Do not attempt to adhere the membrane if the bonding adhesive is wet to the touch.

Adhere the membrane to the substrate so it is free of wrinkles, fishmouths, or voids.

Broom the membrane to achieve maximum adhesion. Do not try to reposition the sheet once it has been adhered to the substrate.

Apply lap sealant along edges of repair.

Delete subparagraph below if no ballast.

Redistribute the ballast over the exposed area after the seam sealant has skinned over.

* + - 1. PHASING OF MEMBRANE INSTALLATION
				1. Limit the removal of existing materials and repairs to areas that can be completely repaired within the same day.
			2. FIELD QUALITY CONTROL
				1. As the repairs are completed or at the end of each workday, in the presence of the Director’s Representative closely examine joints in the membrane and repairs. Cut out and repair areas of the joints that are not fully bonded or that contain “fishmouths” or “wrinkles.” Repair the membrane so it is restored to its full waterproof integrity. Lap patches a minimum of 6 inches beyond cuts.

Delete subparagraph below if no ballast.

After the Director’s Representative has examined the repair, redistribute the ballast over the exposed area.

END OF SECTION 070153