 Specifications

SECTION 07 54 23

THERMOPLASTIC MEMBRANE ROOFING

 TPO RHINOBOND ATTACHMENT OVER STEEL DECK

\*\* NOTE TO SPECIFIER \*\* Flex Roofing Systems; thermoplastic membrane roofing.
 .
 This section is based on the products of Flex Roofing Systems, which is located at:
2670 Leiscz's Bridge Road Suite 400
Leesport, PA 19533
Toll Free Tel: 800-969-0108
Tel: 610-916-9500
Email: [request info (jdoyle@flexmembranes.com)](http://admin.arcat.com/users.pl?action=UserEmail&company=Flex%20Roofing%20Systems&coid=32538&rep=&fax=&message=RE:%20Spec%20Question%20(07540fmi):%20%20&mf=)
Web: [www.flexroofingsystems.com](http://www.flexroofingsystems.com)
[ [Click Here](http://www.arcat.com/arcatcos/cos32/arc32538.html) ] for additional information.

 Flex Roofing Systems (Flex) is the manufacturer of high quality Thermoplastic Single Ply and Multi Ply Roofing Systems based on DuPont's Elvaloy KEE (ketone ethylene ester). Flex's Roofing Membranes with Elvaloy resin modifiers are performance proven and are specified for commercial, industrial and institutional roofing applications. Flex also manufactures high-quality PVC (polyvinyl chloride) roof membranes and TPO (thermoplastic polyolefin) roof membranes.

 Thermoplastic Single Ply and Multi Ply Roofing Systems Flex Roofing Systems Based On Elvaloy® are the only thermoplastic single ply system types completely compatible with asphalt.
 Lets you directly cap smooth BUR to minimize tear-off labor and debris disposal cost.
 Stays flexible and workable indefinitely, even in extreme environments.
 Repels chemicals, air conditioning coolants, jet fuels, restaurant grease, as well as UV light, airborne bacteria, acid rain and industrial pollutants.
 Are tough and resistant to tearing by workmen, their tools and equipment.
 Reflects heat to reduce air conditioning loads.
 Are easy to clean and are unharmed by the harshest cleaning agents.
 Are environmentally-friendly, containing no volatile organic compounds (VOC's).
 Apply either fully adhered or mechanically attached.
 Are proven in the toughest climates and environments.

 Flex pre-formed flashings, including pipe flanges, inside and outside corners help reduce installation time for penetrations, and corners. Walkways with skid-resistant texture add a convenient access path for workman and help add to roof service life.
 Flex provides a complete line of environmentally friendly adhesives for use with thermoplastic single ply roofing membranes.
 Flex supplies all the metal components required for an outstanding installation, including a full range of fasteners, termination bars, coping cap, gravel stops, fascia, retrofit roof drains, Flexclad metal and accessories.

 Warranty: Flex Single Ply and Multi Ply Systems carry standard five, ten, fifteen, twenty or twenty-five year warranties, depending upon the product used, the method of application, the type of application and the climatic environment.

1. GENERAL
	1. SECTION INCLUDES

\*\* NOTE TO SPECIFIER \*\* Delete items below not required for project.

* + 1. Rhinobond attached membrane over steel.
	1. RELATED SECTIONS

\*\* NOTE TO SPECIFIER \*\* Delete any sections below not relevant to this project; add others as required.

* + 1. Section 06 10 00 - Rough Carpentry.
		2. Section 07 62 00 - Sheet Metal Flashing and Trim.
	1. REFERENCES

\*\* NOTE TO SPECIFIER \*\* Delete references from the list below that are not actually required by the text of the edited section.

* + 1. American Society for Testing and Materials (ASTM) - Annual Book of ASTM Standards.
			1. ASTM C208 - Standard Specification for Cellulosic Fiber Insulating Board.
			2. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.
			3. ASTM C728 - Standard Specification for Perlite Thermal Insulation Board.
			4. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.
			5. ASTM D41 - Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.
			6. ASTM D312 - Standard Specification for Asphalt Used in Roofing.
			7. ASTM D1079 - Standard Terminology Relating to Roofing, Waterproofing, and Bituminous Materials.
			8. ASTM D4263 - Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method.
			9. ASTM D6878 - Standard Specification for Thermoplastic Polyolefin (TPO) Sheet Roofing.
			10. ASTM D751 - Standard Test Methods for Coated Fabrics.
			11. ASTM D2137 - Standard Test Methods for Rubber Property-Brittleness Point of Flexible Polymers and Coated Fabrics.
			12. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.
			13. ASTM D1204 - Standard Test Method for Linear Dimensional Changes of Nonrigid Thermoplastic Sheeting or Film at Elevated Temperature.
			14. ASTM D471 - Standard Test Method for Rubber Property-Effect of Liquids.
			15. ASTM D1149 - Standard Test Methods for Rubber Deterioration-Cracking in an Ozone Controlled Environment.

\*\* NOTE TO SPECIFIER \*\* Retain the next paragraph only if CRRC Roofs are Specified.

* + - 1. ASTM C1549 - Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer.

\*\* NOTE TO SPECIFIER \*\* Retain the next paragraph only if CRRC Roofs are Specified.

* + - 1. ASTM C1371 - Standard Test Method for Determination of Emittance of Materials Near Room Temperature Using Portable Emissometers

\*\* NOTE TO SPECIFIER \*\* Retain the next paragraph only if ENERGYSTAR Roofs are Specified.

* + - 1. ASTM E903 - Standard Test Method for Solar Absorptance, Reflectance, and Transmission of Materials Using Integrating Spheres.
		1. U.S. Green Building Council (USGBC).
		2. Leadership in Energy and Environmental Design (LEED).
		3. Factory Mutual (FM Global) - Approval Guide.
			1. Factory Mutual Standard 4470 - Approval Standard for Class 1 Roof Covers.
		4. Underwriters Laboratories (UL) - Roofing Systems and Materials Guide (TGFU R1306).
		5. California Title 24 Energy Efficient Standards.
		6. ENERGYSTAR.
		7. Cool Roof Rating Council (CRRC).
		8. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) - Architectural Sheet.
		9. National Roofing Contractors Association (NRCA).
		10. American Society of Civil Engineers (ASCE).
			1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
	1. DEFINITIONS
		1. Roofing Terminology: Refer to ASTM D1079 and the glossary of the National Roofing Contractors Association (NRCA) Roofing and Waterproofing Manual for definitions of roofing terms related to this section.
	2. PERFORMANCE REQUIREMENTS
		1. Provide an installed roofing membrane and base flashing system that does not permit the passage of water, and will withstand the design pressures calculated in accordance with the most current revision of ASCE 7.
		2. Flex Membrane shall provide all primary roofing materials that are physically and chemically compatible when installed in accordance with manufacturers current application requirements.
	3. SUBMITTALS
		1. Submit under provisions of Section 01 30 00.
		2. Product Data: Manufacturer's data sheets on each product to be used, including:
			1. Preparation instructions and recommendations.
			2. Storage and handling requirements and recommendations.
			3. Installation methods.
		3. Shop Drawings:
			1. Show outline and size of the roof, location and type of penetrations, perimeter and penetration flashing detail references to manufacture's standard. Details which do not conform to roofing manufacturer's standards shall be identified with separate approval from roofing manufacturer. Details to be employed on the project shall be approved by roofing manufacturer.

\*\* NOTE TO SPECIFIER \*\* Delete selection samples if colors have already been selected.

* + 1. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
		2. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.
	1. QUALITY ASSURANCE
		1. Manufacturer Qualifications: Flex Membrane shall provide a roofing system that meets or exceeds all criteria listed in this section.
		2. Installer Minimum Qualifications:

\*\* NOTE TO SPECIFIER \*\* Delete installer classification not required.

* + - 1. Installer shall be classified as an Approved Contractor as defined and certified by Flex Membrane.
		1. Source Limitations: Components listed shall be provided by a single manufacturer or approved by the primary roofing manufacturer.
		2. Final Inspection: Manufacturer's representative shall provide a comprehensive final inspection after completion of the roof system. All application errors shall be addressed and final punch list completed.
		3. Pre- Installation Conference:
			1. Prior to scheduled commencement of the roofing installation and associated work, conduct a meeting at the project site with the installer, architect, owner, Flex Membrane representative and any other persons directly involved with the performance of the work.
			2. The installer shall record conference discussions to include decisions, agreements, and open issues and furnish copies of recorded discussions to each attending party. The primary purpose of the meeting is to review foreseeable methods and procedures related to roofing work.
	1. REGULATORY REQUIREMENTS
		1. Work shall be performed in a safe, professional manner, conforming to federal, state and local codes.
		2. Exterior Fire Test Exposure: Provide a roofing system achieving a UL Class rating for roof slopes indicated.

\*\* NOTE TO SPECIFIER \*\* Delete roof class rating not required.

* + - 1. UL Class A rating.
			2. UL Class B rating.
			3. UL Class C rating.
		1. Windstorm Classification: Provide a roofing system which will achieve the following Factory Mutual wind uplift rating, as listed in the current FM Approval Guide.

\*\* NOTE TO SPECIFIER \*\* Delete roof wind uplift rating not required.

* + - 1. Factory Mutual 1-60.
			2. Factory Mutual 1-75.
			3. Factory Mutual 1-90.
			4. Factory Mutual 1-120.
	1. DELIVERY, STORAGE, AND HANDLING
		1. Deliver roofing materials to the site in original containers, with factory seals intact. Products shall carry either a Flex Membrane label.
		2. Store pail goods in their original undamaged containers in a clean, dry location within their specified temperature range.
		3. Do not expose materials to moisture in any form before, during, or after delivery to the site. Reject delivery of materials that show evidence of contact with moisture.
		4. Remove manufacturer supplied plastic covers from materials provided with such. Use "breathable" type covers such as canvas tarpaulins to allow venting and protection from weather and moisture. Cover and protect materials at the end of each work day. Do not remove any protective tarpaulins until immediately before the material will be installed.
		5. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.
	2. PROJECT CONDITIONS
		1. Weather:
			1. Proceed with roofing only when existing and forecasted weather conditions permit.
			2. Ambient temperatures shall be above 45 degrees F (7.2 degrees C) when applying hot asphalt or water based adhesives.
	3. WARRANTY

 \*\* NOTE TO SPECIFIER \*\* Delete warranty not required.

* + 1. Manufacturer warrants to the Building Owner, subject to the terms, limitations, and conditions for a period specified, in which the Materials and Workmanship Warranty is effective, the materials installed shall be free from defects in materials supplied and/or defective workmanship provided by the authorized applicator.
			1. The Manufacturer's Technical Service Representative shall inspect the completed roof system, and upon acceptance, the manufacturer shall issue the specified warranty commencing on the Date of Substantial Completion
			2. The Roofing System shall receive the manufacturer's standard ten (10) year, fifteen (15) year, twenty (20) year, or twenty-five (25) year guarantee of watertightness.

B.\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + 1. Sheet Metal Warranty: Materials supplied by the roofing manufacturer.
			1. Materials shall be free of defects in material and workmanship for five years after shipment. Defective materials will be repaired or replaced at manufacturer's option. Manufacturer shall not be liable for direct or consequential damages arising from the installation of materials. No other express or implied warranties apply to the products.

\*\* NOTE TO SPECIFIER \*\* FlexCap Coping System only. Delete if not required.

* + - 1. Special Performance Warranty: The FlexCap Coping System in standard sizes, when used as a part of a Flex Roofing System Installation, and installed according to manufacturer’s instructions, shall not blow off, leak, or cause membrane failure, for an identical period as that warranty for the roof system itself, or we will repair or replace the Coping Cap material.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + - 1. Decorative Finish Warranty: Pre-finished aluminum and 24 gauge (0.607 mm) galvanized steel, coated with Kynar 500 finish shall receive a limited 20 year warranty.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + - 1. Spray-applied Kynar 500 finish shall receive a limited 5 year warranty.
1. PRODUCTS
	1. MANUFACTURERS
		1. Acceptable Manufacturer: Flex Membrane International Corp., which is located at: 5103A Pottsville Pike, Reading, PA 19605 ; Toll Free Tel: 800-969-0108; Tel: 610-916-9500; Fax: 610-916-9501; Web: [www.flexroofingsystems.com](http://www.flexroofingsystems.com)
		2. Substitutions: Not permitted.

\*\* NOTE TO SPECIFIER \*\* Delete one of the following two paragraphs; coordinate with requirements of Division 1 section on product options and substitutions.

* + 1. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00.

\*\* NOTE TO SPECIFIER \*\* Delete insulation if not required.

* 1. SYSTEM

A. Flex TPO Plus Roofing System

* + - 1. Color: White
			2. Color: Gray
			3. Color: Tan
			4. Roof System: Provide and install a Mechanically Attached, Thermoplastic, CRRC approved roofing membrane to a protected insulation system on a structural metal deck.
	1. MEMBRANE
		+ - 1. Membrane: The roofing membrane shall meet or exceed the requirements of ASTM D6878 standard for Thermoplastic Polyolefin (TPO) Based Sheet Roofing.
				2. TPO Membrane:

TPO Plus 60 Mil Reinforced

TPO Plus 80 Mil Reinforced

* 1. INSULATION

A.\*\* NOTE TO SPECIFIER \*\* Delete roof board types not required.

\*\* NOTE TO SPECIFIER \*\* Delete insulation not required. Flex Insulation required for system warranty.
 \*\* NOTE TO SPECIFIER \*\* 1/2 inch (12 mm) thickness is susceptible to breakage during installation. Delete if not required.

* + 1. Extruded Polystyrene Boards: Federal specification HH-I-524C, Type IV minimum thickness 1 inch (25 mm), minimum density 1.6 lb./cf (26 kg/cu m).

B. Flex ISO II: A closed cell polyisocyanurate foam core laminated to black (non-asphaltic), fiber-reinforced felt facers. Manufactured in accordance with ASTM C 1289, Type II, Class 1.

* + 1. Polyisocyanurate and Polyurethane Faced Roof Boards: Federal spec. HH-I-1972/ 1&2 Class 1-3, minimum thickness 1 inch (25 mm) nominal.
		2. Tapered Edge Strip: Factory fabricated rigid perlite strip cut at angles to provide a smooth transition between differences in elevation
	1. ACCESSORY MATERIALS:
1. Adhesives:
	1. Flex TPO Bonding Adhesive: Solvent-based Bonding Adhesive: Solvent based adhesive for use with Flex TPO membranes.
	2. Flex TPO Low VOC Bonding Adhesive: Low VOC solvent-based Bonding Adhesive: Solvent based rubberized adhesive for use with Flex TPO membranes.
	3. Flex TPO Cut-Edge Sealant: Solvent based liquid, required to protect field cut edges of Flex TPO membranes. Applied directly from a squeeze bottle.
	4. Flex TPO Primer: Solvent based primer for preparing surfaces to receive butyl based adhesive tapes.
	5. Flex TPO Low VOC solvent based primer for preparing surfaces to receive butyl based adhesive tapes.
	6. Flex TPO Weathered Membrane Cleaner: Solvent based seam cleaner used to clean exposed or contaminated seam prior to heat welding.
	7. Flex Polyurethane Sealant: Commercial grade roofing sealant suitable for sealing the upper lip of exposed termination bars and penetrations and around clamping rings.
	8. Asphalt primer: ASTM D 41 Standard Asphalt Primer.
	9. Flex Insulation Adhesive: two part urethane foam adhesive for adhering insulation or cover boards to approved substrates.

a. Olybond 500, Olybond 500 Spot Shot or Olybond 500 Canister Spatter

b. Millennium PG-1 or One Step.

c. ICP CR-20 or Board Max

1. Fasteners:
	* + 1. Metal Decks: screw type fasteners treated for corrosion resistance with ultimate pull out value of minimum 275 lb (189 kg) in 22 (0.759 mm) gauge steel deck to be applied in conjunction with Factory Mutual approved pattern:
				1. Flex Screws, Corrosion Resistant # 10 Coating
				2. SFS Intec, Dekfast Fastening System, C-2 type, corrosion resistant only.
				3. OMG Inc., Fasteners, screws long and short, Endurion coated only.
			2. Plywood Decks: screw type fasteners applied in a Factory Mutual approved pattern and method.
				1. Flex Screws, Corrosion Resistant # 10 Coating
				2. SFS Intec Inc., Dekfast Fastening System, C-2 type, corrosion resistant only.
				3. OMG Inc. Fasteners, screws long and short, Endurion coated only.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + - 1. Solid Wood Decks: screw or nail type fasteners:
				1. Flex Screws, Corrosion Resistant # 10 Coating
				2. SFS Intec, Dekfast Fastening System, C-2 type, corrosion resistant only.
				3. OMG Inc., Fasteners, screws long and short, Endurion coated only.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + - 1. Masonry Decks: solid limestone concrete block minimum pullout resistance shall be 525 lb. (236 kg), expanded slag block minimum pullout resistance shall be 1100 lb. (495 kg), poured concrete, minimum pullout resistance shall be 1000 lb. (450 kg):
				1. SFS Intec. Dekspike Concrete Roofing Anchor
				2. OMG Inc., Fluted Nail or Olympic CD-10

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + - 1. Through Lightweight Concrete or Gypsum Fill:
				1. On steel deck see 3A above.
				2. On foamboard: toggle bolts or,
				3. OMG, Inc. GypTec or Lite Deck Fastener.
				4. SFS Intec, Dek Lite Fastener .

C. Caulking: Silicon, polysulfide or polyurethane caulking, exterior grade for caulking, surface reglets and vent pipe details.

* + - 1. Mameco, Vulkem 116, Polyurethane.
			2. Sonneborn, NP1.
			3. BOSTIK, Chem Caulk
			4. For filling pitch pans: Flex Pourable Sealer or as approved by Flex Technical Services Department.
			5. Geocel 3300 Polyurethane

D. Flashing:

1. Reinforced Membrane: Same material, color and thickness as roof membrane for all curbs, walls and penetrations.

2. Non reinforced Membrane: Multi angled intersections, sealant pockets and other conditions that would be impractical for reinforced membrane application.

\*\* NOTE TO SPECIFIER \*\* Typically not required for mechanically attached applications. Delete if not required.

* + 1. Base Sheet:
			1. Base sheets or ply sheets installed over substrate or insulation system as an integrated component of Flex built up roofing system.
				1. Flex SBS 80 mil S/S Base Sheet.
				2. Premium Flex Ply Roofing Felt.
		2. Wood Nailers:
			1. Number 2 grade lumber minimum salt treated for rot and fire resistance.
				1. Wolmanized.
				2. Osmose treated.
				3. Pressure treated.

\*\* NOTE TO SPECIFIER \*\* Separation layers are for use over insulation and below membranes with mechanically fastened systems. Red rosin paper and sheet polyethylene are not approved. Delete if not required.

* + 1. Separation Layers:
			1. Flex Separator Sheet.
			2. Flex Green Guard 3/8 inch PB6W Fan Fold Roofing Recovery Board.
			3. Georgia Pacific Corporation: Dens Deck, Dens Deck Prime distributed by Flex Roofing System.
			4. USG Securock distributed by Flex Roofing System.
			5. Flex ½” HD Coverboard, High Strength Polyisocyanurate Foam with coated Glass Facers distributed by Flex Roofing System.
		2. Detailing Components:
			1. Flex Universal Inside/Outside Corners.
			2. Flex Molded Pipe Seals.
			3. Flex Molded Sealant Pocket.
			4. Flex Split Pipe Boots.
			5. Flex Square Tube Wraps.
			6. Flex TPO PS Coverstrip
			7. Flex TPO Coated Metal.
			8. Flex Retrofit Drains - Clamping Ring Model.
			9. Flex Walkway Pad: Traffic Pads: 34 inches (863 mm) wide by 50 feet (16 m) long thermoplastic material provided by the membrane manufacturer.
			10. Flex 2-3/8 inches (60 mm) XHD Barbed Plate.
			11. Flex 2-3/4 inches (70 mm) SXHD Barbed Plate.
			12. Flex Base Sheet Fastener.
			13. Flex Termination Bar.
			14. Flex Standard Screws.
			15. Flex HD Standard Screws.
			16. Flex XHD Standard Screws.
			17. Flex SXHD Standard Screws.

2.6 VAPOR RETARDERS

A. Polyethylene : 10 mil (0.25 mm) thick polyethylene vapor retarder.

B. Flex SA Vapor Barrier: SBS Modified Bitumen vapor barrier 31 mil (0.8mm) thick styrene-butadiene-styrene (SBS) polymer modified bitumen in combination with a high tack self-adhesive specifically designed for use with steel decks. The topside is surfaced with high strength tri-laminate polyethylene film and the underside is surfaced with protective poly-olefin release film that is removed during application.

C. Flex SBS 80 mil base sheet: 80 mil (2.0 mm) SBS polyester reinforced membrane with sanded upper and lower surface for mopping or cold applied adhesives to substrates or insulation boards.

D. Flex NP 180 s/p base sheet: 90 mil (2.2 mm) SBS polyester reinforced membrane with sanded upper surface to receive mopping or cold applied adhesives for insulation or cover boards. Plus a thermofusable lower surface for torch applied installation to approved substrates.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that the surfaces and site conditions are ready to receive work.

B. Verify that the deck is supported and secured.

C. Verify that the deck is clean and smooth, free of depressions, waves, or projections, and properly sloped to drains, valleys, eaves, scuppers or gutters.

D. Verify that the deck surfaces are dry and free of ice or snow.

E. Verify that all roof openings or penetrations through the roof are solidly set, and that all flashings are tapered.

3.2 SUBSTRATE PREPARATION

A.\*\* NOTE TO SPECIFIER \*\* Delete roof deck type not required.

* + 1. Clean surfaces thoroughly prior to installation

B. Prepare deck surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

\*\* NOTE TO SPECIFIER \*\* Tongue and groove or shiplap lumber is preferred to square edge material since subsequent shrinkage or warping of square edge planks may cause ridging of the roof system above adjacent boards.

* + - 1. Deck shall be smooth surfaced. Clean and free of moisture or debris.
			2. Decking shall be F-90 galvanized coated 22 gauge (0.759mm) or heavier steel panel.
			3. Decking shall be installed to prove positive slope and positive drainage.
			4. Deck panels shall be securely anchored to the supporting members in accordance with the Steel Deck Institutes Design Manual and Factory Mutual Recommendations.
			5. Deck panels shall be installed in a straight line and properly aligned.

3.3 INSTALLATION

A. Install roof system in accordance with manufacturer's instructions.

B. Wood Nailers:

1. Locate and install along gravel stops and drip edges and other areas as required by membrane manufacturer.

2. Anchor nailer to structural deck with manufacturer’s approved fasteners, spaced appropriately for the specified installation; minimum withdrawal resistance 100 pounds (45 kg) per fastener.

 (Optional) Install Vapor Retarder

C.\*\* NOTE TO SPECIFIER \*\* Typically not required for insulating concrete and recover decks. Delete if not required.

* + 1. Insulation:
			1. The insulation board shall be secured to the steel deck with Flex Fasteners and Rhinobond plates. Fastener spacing to be no less than 6 fasteners and plates per 4’x8’ insulation board. Installation of the fastener pattern to be in accordance with FM Guidelines.

a. FM 1-90 approval Rhinobond fastener assemblies placed on a 2’x3’ grid pattern.

b. FM 1-120 approval Rhinobond fastener assemblies placed on a 2’x2’ grid pattern.

\*\* NOTE TO SPECIFIER \*\* Mechanically attached reinforced membrane. Delete next three provisions if not required.

* + - 1. Do not overdrive the fastener and plate. The fastener and plate should be tight and flat to the substrate with no dimpling of the surface.
			2. Multiple layers of insulation board may be fastened simultaneously.
			3. Insulation board size as recommended by manufacturer for mechanically attached application.

\*\* NOTE TO SPECIFIER \*\* General provisions applied to all applications.

* + - 1. Do not install wet, damaged or warped insulation boards.
			2. Install insulation boards with staggered board joints in one direction.
			3. Insulation boards to be installed so that no gaps larger than 1/4 inch (6 mm) are found at the end joints and that the adjoining top surfaces are flat and smooth. All gaps in excess of 1/4 inch (6 mm) shall be filled with like insulation material.
			4. If more than one layer of insulation board is to be installed the joints of the subsequent layers must be staggered. Stagger the joints in the additional layers a minimum of 6 inches (152 mm) from the underlying insulation boards to eliminate vertical gaps.
			5. Do not install any more insulation than will be completely waterproofed each day.

D.\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + 1. Recover Board:
			1. Recover boards to be installed so that no gaps larger than 1/4 inch (6 mm) are found at the end joints and that the adjoining top surfaces are flat and smooth.
			2. Stagger the joints in the recover board a minimum of 6 inches (152 mm) from the underlying insulation boards to eliminate vertical gaps.
			3. Do not install any more recover board than will be completely waterproofed each day.

E.\*\* NOTE TO SPECIFIER \*\* Adhered fleece backed application only. Delete if not required.

* + 1. Base Sheet:

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + - 1. Fully mop substrate with a coating of hot steep asphalt applied to the substrate within 25 degrees F

(15 degrees C) of the bitumen's EVT. Imbed the base sheet or ply sheet into the hot steep asphalt. If applying base sheet with a cold adhesive follow the adhesive manufacturer's installation instructions.

* + - 1. Do not install any more base sheet or ply sheet than will be completely waterproofed each day.

F.\*\* NOTE TO SPECIFIER \*\* Adhered fleece backed application only. Delete if not required.

* + 1. Membrane Installation:

1. The roof surface must be clean, dry and free of foreign material.

2. Position sheets as indicated on approved shop drawings. Measure and chalk lines on the substrate to establish proper alignment of the sheet. All field sheets shall be shingled or run parallel to the slope of the roof to avoid the restraint of water flow.

3. Place the roll on the line and unroll the Flex TPO Plus its entire length and allow the membrane to relax. The relaxation time required is dependent on the ambient air temperature.

4. The membrane shall be positioned in order to provide a minimum of 2” wide finished lap joint for the length of the roll and a minimum of 4” wide finished width for the end laps. The selvedge edge seam and end laps will be completed by the hot air welding method. Seams are to be completed each day during construction.

1. The Flex TPO Plus membrane is installed over the RhinoBond plate and fastener assemblies. The membrane is welded by electromagnetic induction to the RhinoBond plate with the Rhino Welder.

G. Flashing:

* + - 1. Flash penetrations, walls, curbs, expansion joints, drains as shown on details and approved shop drawings with Flex flashing membrane.
			2. Use prefabricated sealant pockets and pre-molded vent / pipe flashing.
			3. Mechanically fasten flashing at terminations according to approved details. Fastening flashing membrane through counter-flashing metal is not acceptable.
			4. Flashing membranes shall be adhered to the approved substrate with Flex Flashing Adhesive. Flashing Membrane is to be installed flat and wrinkle free. Flashings shall be rubbed or rolled onto the substrate for proper adhesion.

3.4 INSPECTION

A. Seam Inspection:

1. All seams are to be completed by the hot air welding method each day as the installation progresses.

2. The roofing contractor is to designate a responsible person experienced in hot air welding techniques to inspect the completed installation each day as the installation progresses. The inspection is to include hand probing of all welded seams.

3. Any defects found during these inspections should be immediately corrected.

* + 1. Manufacturer's Field Services:
			1. Provide manufacturer's field service consisting of product use recommendations and periodic site visits for inspection of system installation in accordance with manufacturer's instructions.
			2. Site Visits: Final inspection and acceptance of the installation by the manufacturer’s technical representative is required before a warranty can be issued.

3.5 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION