



Thermoplastic Single Ply and Multi-Ply Roofing Systems

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FLEX TPO PLUS MECHANICALLY ATTACHED ROOF SYSTEM GENERAL SPECIFICATION

This specification is a general description of the Flex TPO Plus mechanically fastened roof system requirements and is intended for use as a submittal form. It is important to realize that each roofing project is unique and the Specifier's design criteria as well as Flex's current details and specifications should be thoroughly reviewed prior to proceeding with the roof installation.

PART 1 GENERAL

1.01 Description

The Flex TPO Plus mechanically fastened roof system is assembled from Flex's scrim reinforced thermoplastic polyolefin (TPO) roof membranes. The Flex TPO Plus membranes are available in standard manufactured widths of 4', 6', 8', 10' and 12'. The Flex TPO Plus is produced in a 45 mil or 60 mil thick membrane. Flex TPO Plus Extra is produced in a 72 mil or 80 mil thick membrane. The membranes are available in white, gray, or tan surface color. An approved roof insulation board is pre-secured to an acceptable roof deck with the appropriate fastener assembly. Flex TPO Plus (4', 6', 8', 10' and 12' wide) perimeter sheets are installed in a picture frame fashion along the entire building edge perimeter. The perimeter sheet and field membrane sheets are mechanically fastened to the roof deck with the appropriate Flex Fastener and Plate assembly. All sheets of the Flex TPO Plus roofing membrane are overlapped along the selvage edge and sheet ends. The membrane is permanently sealed at the seams by the hot air welding method. The required number of perimeter membrane rows and the fastener spacing is determined by the specific project wind uplift resistance pressure design. Contact Flex Technical Services for information regarding the membrane row spacing and fastener pattern density.

1.02 QUALITY ASSURANCE

A. This roofing system must be installed by a Flex Authorized Applicator. The installation of the roof system is to be performed in compliance with current Flex Specifications and Details. Deviations from Flex's specifications and details must be approved in writing by the Flex Technical Service Department prior to commencing with the installation.

- B. When the Applicator has completed the installation, arrangements must be made for an inspection of the completed roof system by a Flex Technical Service Representative. The inspection is to determine that the roof installation has been performed in accordance with current Flex Details and Specifications and that the installation may qualify for a Flex Roof System Warranty.
- C. Flex Roofing Systems are approved as roofing assemblies by FM Approvals and Underwriters Laboratories. Flex Roof Systems are approved for use by the Miami-Dade County BCCO, the State of Florida Building Code and the ICC.

1.03 SUBMITTALS

- A. To determine that a project can be qualified for a roof system warranty the following Project types must be forwarded to Flex Technical Service for review prior to beginning the installation.
 - 1. Projects that are in locations that require wind speed coverage greater than Beaufort Wind Scale Force 11.
 - 2. Projects where the building is greater than 50' in height.
 - 3. Projects where the building may be classified as partially enclosed.
 - 4. Buildings that are used for cold storage or freezer facilities.
 - 5. Projects that located in or are subject to exposure to petroleum based products or harsh chemicals.
- B. Prior to beginning the Flex Roof System installation the applicator must submit to Flex Technical Services a Request for Guarantee form and shop drawings of the project.
 - 1. Mechanically attached Flex Roof Systems proposed for the following deck types require that a pull out test be performed by a qualified representative of the fastener manufacturer and the results be submitted to Flex for review and written approval:
 - a. Lightweight concrete installed on steel decks lighter than 22 gauge.
 - b. Plywood decks less than 5/8" thick or OSB decks less than 7/16" thick.
 - c. Cementitious Wood Fiber Decks.
 - d. Gypsum Decks.

1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver the materials to the job site in the original, unopened containers labeled with the manufacturer's name, brand name and installation instructions.
- B. Store Flex TPO Plus membrane in the original undisturbed plastic wrap.
- C. Provide job site storage in a temperature range between 40°F and 90°F.
- D. Insulations and underlayments must be stored to keep dry and protected from the elements. Store insulation on skids and completely cover with a breathable tarp or canvas.

1.05 JOB CONDITIONS

- A. The Flex TPO Plus mechanically attached roof system may not be installed on roof slopes greater than 18:12.

- B. If the application is a recover installation, the Building Owner and the Roofing Contractor are responsible for accepting the condition of the existing roof cover as suitable for recover installation. Any wet insulation must be completely removed and replaced with new insulation. Any damaged or deteriorated areas of the structural deck must be removed and replaced.
- C. Sprayed in place urethane foam roofing and phenolic foam insulation are not acceptable for recover applications and must be entirely removed prior to installing the Flex roof system.
- D. The use of a vapor barrier or air barrier is optional and the requirement for installing the barrier should be determined by a design professional.
- E. Coordination between trades is essential to avoid unnecessary traffic over sections of the roof and to prevent damage to the roofing system.

1.06 WARRANTY

- A. Material Only warranty is available for a term of five (5), ten (10), fifteen (15), twenty (20) or thirty (30) years.
- B. Labor and Material warranty is available for a term of five (5), ten (10), fifteen (15), twenty (20) or thirty (30) years.
- C. A Total Systems warranty is available for a term of five (5), ten (10), fifteen (15) twenty (20) or thirty (30) years.
- D. Contact Flex Technical Services regarding warranty fees or restrictions.

PART II PRODUCTS

2.01 GENERAL

The components of this roofing system are to be products manufactured, supplied or approved in writing by Flex Membrane International, Inc. The installation, performance or integrity of products by others is not the responsibility of Flex and is not covered under the terms, limitations, and conditions of the Flex Warranty.

2.02 MEMBRANE

Flex TPO Plus 45, 60, 72 or 80 mil thermoplastic polyolefin reinforced membrane is used for this system. The Flex TPO Plus membrane is manufactured in 4', 6', 8', 10' and 12' wide sheets x 100' in length. Perimeter sheets are 4' and 6' wide and provide for picture framing the roof perimeter area.

2.03 RELATED MATERIALS

- A. Flex TPO Plus reinforced flashing membrane. 45, 60, 72, or 80 mil thick used for flashing details, walls, curbs and roof penetrations.
- B. Flex TPO Plus non-reinforced flashing membrane. Flashing details that require more flexibility than provided by the reinforced flashing membrane.
- C. Flex Bonding Adhesive. Adhere the Flex TPO Plus membranes to acceptable horizontal and vertical substrates.
- D. Cut Edge Sealant. Applied to all non-factory edges where the reinforcing scrim is exposed.
- E. Flex Water Cut Off Mastic.

- F. Flex Approved Caulking Sealants. (Sonneborn NPI, Bostik Chem Caulk, Chemlink M-1)
- G. Flex Weathered Membrane Cleaner.
- H. Flex Pourable Sealer. Pitch pan sealant
- I. Flex Walkway Pad.
- J. Pre-formed inside/outside corners.
- K. Pre-formed pipe boots.

PART III EXECUTION

3.01 GENERAL

- A. When possible, begin the application at the highest point of roof level and work to the lowest point to prevent moisture infiltration and to minimize construction traffic on completed sections. Complete all flashings and terminations as the installation progresses. Seal off and make watertight at the end of each work day.
- B. Proper substrate shall be provided by the Building Owner. The structure shall be sufficient to withstand normal construction loads and live loads.
- C. Defects in the roof deck must be reported and documented to the Building Owner or his representative for assessment. The roofing contractor shall not proceed with the installation unless the defects have been corrected.

3.02 SUBSTRATE PREPARATION

- A. Retrofit or recover roof projects require that all wet insulation be removed and replaced with new insulation of the appropriate dimensions to achieve a relatively flush surface acceptable for roofing installation.
- B. Substrate must be even without noticeable high spots or depressions. Surface must be dry and free from accumulated water, ice or snow.
- C. The substrate must be clean and cleared of debris or foreign matter. Asphalt spills or bitumen based roof cements must be removed or concealed.

3.03 INSTALLATION

- A. Flex Insulation Board is pre-secured to the deck with the appropriate Flex Fastener and Plate approved for the type of deck receiving the roof system.
- B. A minimum of one perimeter sheets shall be installed at the edges of each roof level.
- C. Flex TPO Plus 4', 6', 8', 10' or 12' sheets are installed in the field of the roof.
- D. Flex TPO Plus membrane sheets are mechanically fastened with the appropriate Flex fastener and plate spaced at a minimum of 12" o.c. placed within the overlapped edges of the membrane.
- E. The membrane is overlapped along the length of the roll approximately 5 ½" where the fastening plates are located and a minimum of 4" at the end of roll sections.

- F. The seams are completed by the hot air welding method. The welded seam shall be a minimum of 1 1/2" when completed.
- G. All seams are to be welded the same day as the membrane is installed. The seams are to be manually checked with a seam probe and any deficiencies corrected that day.
- H. The membrane must be properly secured at the perimeter of each roof level, roof section, expansion joint, all roof penetrations and any angle change which exceeds 2" in one horizontal foot.

3.04 MEMBRANE FLASHING

- A. Flash all walls and curbs with Flex TPO Plus reinforced membrane.
- B. Inside and outside corners, field fabricated pipe flashing, and other details where pre-formed accessories would not be appropriate install the Flex TPO Plus non-reinforced flashing membrane.
- C. The Flex TPO Plus reinforced membrane is adhered to the approved substrates with Flex Bonding Adhesive.
- D. The top of the vertical edge wall flashings must be securely terminated with Flex Termination Bar fastened a minimum of 12" o.c.
- E. Approved caulking is applied to the back edge of the membrane prior to the bar being installed. Caulking is also applied to fill the sealant lip of the termination bar after installation.

3.05 RELATED WORK

- A. Flex TPO Plus Walkway Rolls are required when walkway pads are specified and are hot air welded to the Flex TPO Plus field membrane.
- B. When concrete pavers are specified an approved separator sheet must be provided between the pavers and the Flex TPO Plus field membrane.
- C. Flex Coping Cap and Architectural Edge Metal Fascia Systems shall be installed in accordance with printed instructions provided with edge system.
- D. Metal accessory items not manufactured or supplied by Flex shall be installed in accordance with the projects Designed Specifications, current NRCA and SMACNA guidelines.

PHYSICAL PROPERTIES

PROPERTY	TEST METHOD	VALUE
Nominal Thickness, min, in.	ASTM D 751	.045", .060", .072", .080"
Thickness over scrim, min, in.	ASTM D 4637	.018", .024", .030", .034"
Solar Reflectance	ASTM C1549	.79 white, .71 tan, .46 gray
Breaking Strength, min., lbf.	ASTM D 751	320, 360, 400, 425
Elongation at Break, min., %	ASTM D 751	25 typical
Tearing Strength, min., lbf	ASTM D 751	130 typical
Brittleness Point, max., °F	ASTM D 2137	-50
Linear Dimensional Change (shrinkage), %	ASTM D 1204	- 0.5 typ.
Ozone Resistance	ASTM D 1149	No cracks
Resistance to Water Absorption, change in mass, %	ASTM D 471	2.0
Resistance to microbial surface growth, rating (1 is very poor, 10 is no growth)	ASTM D 3274	9-10 typical
Field Seam Strength, lbf	ASTM D 1876	60
Water Vapor Permeance, Perms	ASTM E 96	0.05 typ.
Puncture Resistance, lbf.	FTM 101C Method 2031	325, 350, 400, 450
Resistance to xenon-arc Weathering	ASTM G-26	No cracks No loss of tearing or breaking strength