SECTION 075213

APP Modified bitumen ROOFING

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***NOTE TO SPECIFIER***

*Use this Specification Section for Mail Processing Facilities.*

***This is a Type 2 Specification with primarily editable text; therefore, most of the text can be edited, but there is some required text which is noted within the Section with a “Note to Specifier.” Do not revise these paragraphs without an approved Deviation from USPS Headquarters, Facilities Program Management, through the USPS Project Manager.***

*For Design/Build projects, do not delete the Notes to Specifier in this Section so that they may be available to Design/Build entity when preparing the Construction Documents.*

*For the Design/Build entity, this specification is intended as a guide for the Architect/Engineer preparing the Construction Documents.*

*The MPF specifications may also be used for Design/Bid/Build projects. In either case, it is the responsibility of the design professional to edit the Specifications Sections as appropriate for the project.*

*Text shown in brackets must be modified as needed for project specific requirements.* *See the “Using the USPS Guide Specifications” document in Folder C for more information.*

*The last date that USPS revised this standard specification section occurs in two places, at the end of this section and in the Table of Contents. If the date in this section matches the date in the Table of Contents, then you are using the latest version. Do not delete or revise the “last revised” date at the end of the section during the development of the Project Manual.*

*The footer in this section should be edited to replace the text, “USPS MPF SPECIFICATION” with the project name, and the blank date in the center should be replaced with the submission date, for interim design reviews, or the issue date of the completed Project Manual.*

***Use this section where a cold-applied APP (Atactic Polupropylene) modified bitumen roofing membrane is selected as the roofing system.***

***A cold-applied APP (Atactic Polupropylene) modified bitumen roofing system is a recommended roofing system over facilities with a Critical or Non-Critical building designation.***

*There are two (2) options regarding primary roof insulation type. The Specifier must provide direction on which one of the options will be selected for this project. The Specifier must edit the section to ensure that this option is consistently applied throughout the section. Note that facilities with a metal roof deck are most conducive to Polyisocyanurate insulation due to the fact that a thermal barrier is not required under the insulation in order to maintain the systems fire rating (Use of XPS over a metal deck would require a thermal barrier under the insulation assembly if selected). Concrete roof decks can utilize Extruded Polystyrene Insulation attached directly to the prepared roof deck without the need for a thermal barrier. The Specifier shall determine the insulation type based on existing construction; building code review; and cost analysis. The insulation type options are:*

*INSULATION Type OPTION 1, Polyisocyanurate.*

*INSULATION Type OPTION 2, Extruded Polystyrene.*

*There are two (2) options regarding insulation attachment. The Specifier must provide direction on which one of the options will be selected for this project. The Specifier must edit the section to ensure that this option is consistently applied throughout the section. Note that facilities with a metal roof deck are most conducive to mechanical attachment of the insulation assembly. Facilities with concrete roof decks are most conducive to adhered attachment of the insulation assembly. The Specifier shall determine the insulation type based on existing construction; building code review; and cost analysis. The insulation attachment options are:*

*INSULATION Attachment OPTION 1, Mechanically attached.*

*INSULATION Attachment OPTION 2, Adhered.*

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# PART 1 - GENERAL

# 1.1 SUMMARY

## A. This Section includes requirements related to the installation of APP (Atactic Polupropylene) modified bitumen roofing membrane, including flashings, DOE Energy Star compliant reflective surfacing, [mechanically fastened] [adhesively applied] roof insulation [and glass mat gypsum board] and related accessories.

1.2 RELATED SECTIONS

A. Section 013300 – Submittal Procedures

B. Section 016000 – Product Requirements

C. Section 076203 - Sheet Metal for Modified Bitumen Roofing.

D. Related Documents: The Contract Documents, as defined in Section 011000 - Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other documents.

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***NOTE TO SPECIFIER***

*Per discussions between the designer and USPS Project Manager, determine the warranty requirements for the project. Choose from the following warranty options and actions:*

*1. If an alternate price for a 20-year “Total System Warranty” is specified, Leave Article 1.3 unchanged.*

*2. If a 20-year “Total System Warranty” will be included in the base proposal, or if no warranty is specified, remove Article 1.3.*

*Re-letter/number items after editing.*

*Two options are available for paragraph 1.3B:*

*1. If the project is located in ASHRAE Climate Zones 1, 2, 3 or 4, a reflective roofing surface meeting the reflectivity requirements of DOE Energy Star is required per USPS Design Standards. This option will be included in the Base Proposal Cost; DELETE Article 1.3B from the list below.*

*2. If the project is located in an ASHRAE Climate Zones 5, 6 or 7, a reflective roofing surface meeting the reflectivity requirements of DOE Energy Star shall be added as an alternate. Do not edit paragraph 1.3B.*

*Per discussions between the designer and USPS Project Manager, determine the required outcome from the list above. Choose one option only. Edit the item below, based on the options listed above. Re-letter/number items after editing, if necessary.*

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1.3 ALTERNATES

A. Provide an alternate price for the 20-Year Total System Warranty described in paragraph 1.9A.

B. Provide an alternate price for application of a reflective white coating over the installed modified bitumen roof system as specified within Articles 2.4 and 3.4 of this Section.

# 1.4 REFERENCES

## A. Reference standards of the following sources are applicable to products and procedures specified in Part 2 - Products and Part 3 – Execution of this Section:

### 1. American Society for Testing and Materials (ASTM)

#### a. ASTM C1177 - Standard Specification for Glass Mat Gypsum Roof Board

#### b. ASTM C1289 - Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board

#### a. ASTM C1177 - Standard Specification for Glass Mat Gypsum Roof Board

#### b. ASTM C1289 - Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board

#### c. ASTM D 6222 - Standard Specification for Atactic Polypropylene (APP) Modified Bituminous Sheet Materials Using Polyester Reinforcements

#### d. ASTM D 226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing

#### e. ASTM D 41 - Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing

#### f. ASTM D 1668 - Standard Specification for Glass Fabrics (Woven and Treated) for Roofing and Waterproofing

#### g. ASTM D 1970 - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection

#### h. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials

### 2. Factory Mutual Global (FMG)

#### a. FMG – RoofNav – Internet Based FM Roof Assembly Testing and Approvals Database

#### b. FMG - Approval Guide, Building Materials

#### c. FMG - Loss Prevention Data 1-28, Wind Loads to Roof Systems and Roof Deck Securement

#### d. FMG - Loss Prevention Data 1-29, Above Deck Roof Components (June 1996)

#### e. FMG - Standard 4450, Class 1 Insulated Steel Deck Roofs

#### f. FMG - Standard 4470, Class 1 Roof Covers

### 3. Underwriters Laboratories (UL)

### 4. National Roofing Contractors Association (NRCA)

### 5. American Society of Civil Engineers (ASCE)

#### a. ASCE 7 Minimum Design Loads of Buildings and Other Structures

# 1.5 SUBMITTALS

## Section 013300 - Submittal Procedures: Procedures for submittals.

## B. Product Data:

## 1. FM RoofNav Assembly Number certifying proposed roof system has been tested and approved by FMG for the specified FM [1-90] [1-105] [1-120] rating.

## 2. Membrane materials, base flashing, vapor retarder, [fastener & plate,] adhesive materials, edge metal and insulation.

## 3. [Insulation fastener layouts complying with FMG Loss Prevention Data Sheet 1-29 patterns for specified wind uplift resistance. Indicate number of insulation fasteners required and spacing of fasteners for field, perimeter, and corners for each pattern.] [Adhesively applied insulation coverage rates and layout must comply with the proposed FM RoofNav assembly number and adhesive application rates relative to that assembly. Indicate insulation adhesive application rates required and the coverage/ribbon spacing of adhesive for field, perimeter, and corners for each pattern. Insulation adhesion rates and coverage/ribbon spacing submissions must also be inclusive of the roof system manufacturer’s instructions, including cold weather installation instructions and are required for approval prior to job start.]

## 4. Adhered membrane adhesive and application rates for adhering membrane roof to the overlayered insulation system with coverboard. Membrane adhesive shall be installed in compliance with roof membrane system manufacturer’s FM RoofNav assembly approval number and all of the manufacturer’s instructions including cold weather installation instructions of the proposed shall be required for approval prior to job start.

## Shop Drawings: Indicate setting plan for insulation including fastener pattern, layout of roofing seams, direction of laps and base flashing details.

## C. Assurance/Control Submittals:

## 1. Certificates: Manufacturer is to certify that components and products meet or exceed specified standards and complies with referenced quality assurance standards in section 1.5 including the FM RoofNav assembly number.

## 2. Qualification Documentation: Manufacturer certification indicating roofing applicator qualifications complying with requirements specified in Paragraph entitled "Applicator Qualifications" of this Section.

## 3. Written certification or product data sheet attesting that proposed roofing membrane meets the EPA ENERGY STAR® Roof Products Program specification for energy efficiency and that the manufacturer is listed as a Partner.

D. Maintenance Instruction: Document training by furnishing a sign-in sheet with a description of the training provided, instructors name and organization and those who received training. Refer to 017704.

# 1.6 QUALITY ASSURANCE PROCEDURES

A. Applicator Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer’s product and that is eligible to receive a manufacturer’s warranty. Company shall have a minimum of 5 years documented experience certified by roofing system manufacturer.

B. Single Source Responsibility: Roofing system materials and components shall be supplied and warranted by roofing system manufacturer for specified roofing system and shall be in compliance with specified regulatory requirements.

C. Examine the technical specifications and drawings. Verify all dimensions, detail conditions, roof plan notes and existing site conditions that may affect the work. Verification of existing dimensions and site conditions is the responsibility of the Contractor. No additional compensation will be considered for failure to verify existing dimensions, detail conditions, roof plan note callouts, and existing site conditions.

D. FMG Listing: Provide roofing membrane, base flashings, and component materials that comply with requirements in FMG 4450 and FMG 4470 as part of a membrane roofing system and that are listed in the most recent FMG “RoofNav” on-line directory or FMG’s “Approval Guide” for Class 1 or noncombustible construction, as applicable. Identify materials with FMG markings.

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***NOTE TO SPECIFIER***

*90 pounds per square foot wind uplift minimum. Design roofing and insulation system to comply with regional requirements and special regulations of local authority having jurisdiction. Verify with USPS Contracting Officer. Contact Roofing System Manufacturer for information about 105 or 120 or greater pounds per square foot of uplift resistance.*

*Edit "Class" in the following paragraph for project's fire resistance and wind uplift resistance requirements. Verify availability of roofing systems that meet these classifications. “Class 1A” signifies meeting ASTM E 108, Class A fire performance for FMG-approved Class 1 roof covers. For areas having three or more hailstorms annually, FMG recommends roofing systems rated SH (severe hail) instead of MH (moderate hail).*

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1. Fire/Windstorm Classification: Class 1A- [90] [105] [120].

2. Hail Resistance: [MH] [SH].

E. Pre-installation Meeting:

1. Convene a Pre installation Meeting at Project Site one week prior to commencing work of this Section.

2. Require attendance of parties directly affecting work of this Section.

3. Review preparation and installation procedures and coordinating and scheduling required with related work.

4. Agenda:

a. Tour, inspect and discuss condition of substrate, roof drains, roof drain final locations, curbs, penetrations and other preparatory work performed by other trades.

b. Review structural loading limitations of deck and inspect deck for loss of flatness and for required mechanical fastening.

c. Review roofing system requirements (Drawings, Specifications and other Contract Documents).

d. Review required submittals, both completed and yet to be completed.

e. Review and finalize construction schedule related to roofing work and verify availability of materials, installer's personnel, equipment and facilities needed to make progress and avoid delays.

f. Review requirements for inspections, testing, certifying, and material usage accounting procedures.

g. Review weather and forecasted weather conditions, and procedures for coping with unfavorable conditions, including possibility of temporary roofing.

## h. Review safety precautions relating to roofing installation.

1.7 DELIVERY, STORAGE AND HANDLING

A. Refer to Section 016000 for transport, handling, storage and product requirements.

B. Deliver materials in manufacturer's original containers, dry, undamaged, seals and labels intact.

C. Store materials in weather protected environment, clear of ground and moisture. Cover insulation, roofing materials, and other moisture-sensitive products with a canvas tarp. Store roll materials standing on end.

D. Protect adjacent materials and surfaces against damage from roofing work. Do not store materials on previously completed roofing.

# 1.8 ENVIRONMENTAL REQUIREMENTS

## A. Do not perform work during inclement weather. Refer to product manufacturer for outdoor temperature requirements for installation of materials. Do not install materials at times when the outdoor temperature does not fall within the minimum/maximum temperature requirements of the manufacturer.

B. Cold weather precautions:

1. NOTE: Do not install APP modified bitumen roofing at temperatures below 50°F (10°C).

2. When the outside temperature is forecast to fall below 50°F (10°C), store unused materials in a heated location. Remove these materials only when ready for installation. Sealants, adhesives and primers should be maintained at a temperature of 50°F (10°C),

minimum, at all times. Do not use sealants, adhesives or primers that develop a gelled or lumpy texture to them. Return these materials to a heated location.

3. Refer to the APP modified bitumen roofing manufacturer and NRCA requirements and recommendations for additional cold weather application recommendations and restrictions.

## C. Safety Data Sheets (SDS) of all specified products shall remain on site for the duration of this project.

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***NOTE TO SPECIFIER***

*Per discussions between the designer and USPS Project Manager, determine the warranty requirements for the project. Choose from the following warranty options and actions:*

*1. If an alternate price for a 20-year “Total System, Non-Pro-Rated Warranty” is specified, do not edit paragraph 1.9A.*

*2. If a 20-year “Total System, Non-Pro-Rated Warranty” will be included in the base proposal, DELETE” an alternate price for” from paragraph 1.9A.*

*3. If no warranty is specified, EDIT the title of Article 1.9 (DELETE the words “MANUFACTURER WARRANTY AND”), and DELETE paragraph 1.9A. The two-year contractor guarantee shall remain in place.*

*Re-letter/number paragraphs and sub-paragraphs after editing.*

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1.9 MANUFACTURER WARRANTY AND CONTRACTOR GUARANTEE

A. Provide an alternate price for a manufacturer 20-Year Total System, Non-Pro-Rated Warranty (including insulation, roofing membrane, and flashings) covering materials and labor. The warranty shall include the following additional items:

1. The warranty shall include a wind rider for the design wind speed at the specific project location.

2. Roofing inspection by a technical representative of the roofing membrane manufacturer 22-24 months after date of Final Acceptance.

3. Roofing manufacturer will provide unlimited repairs during warranty period with no cost limitation.

4. Temporary emergency repairs may be made by United States Postal Service without voiding any warranty provisions.

5. Attach copy of Record Document Roof Plan Drawings, Roof Detail Drawings, and Record APP Modified Bitumen Roofing Specification Section to Warranty.

## B. The Contractor shall provide a two-year contractor guarantee. At a minimum, the contractor guarantee shall include the following:

1. Contractor name, address, phone number and project contact name.

2. The project completion date, and date of guarantee expiration.

3. The contractor guarantee shall include, in writing, all project work, workmanship, and/or all materials installed by the contractor or subcontractors to be of a quality that will comply with all project specific requirements of the Construction Documents and other documents governing the Work and workmanship through the guarantee period.

4. The contractor shall investigate roof leaks during the guarantee period within a reasonable time period, but in no instance greater than 24-hours after notification of a leak. The contractor shall repair leaks determined to be the cause of the Work at no cost to the Owner.

# PART 2 – PRODUCTS

# 2.1 MODIFIED BITUMEN ROOFING SYSTEM SUMMARY

## A. The complete roofing membrane system assembly shall consist of an APP surfacing ply over an APP base ply, meeting or exceeding the requirements listed in paragraphs 2.2A and 2.2B. The completed system shall have a combined minimum thickness of 300 mils.

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**NOTE TO SPECIFIER**

NOTE: In high wind areas, such as those with a calculated wind uplift pressure of greater than 45 psf in the roof field, enhancements to the roof system may be required and must be considered by the design professional/specifier. Consult with the roofing membrane manufacturer and qualified testing agencies such as FM and Miami-Dade County for further information and guidance related to possible roof system enhancements in high wind areas.

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B. The complete roofing system assembly shall resist uplift pressures calculated according to ASCE 7-05 for the field, perimeters and corners. The specified approval rating must incorporate a safety factor of 2 over the maximum calculated uplift pressure in foot-pound units.

## C. The complete roofing system assembly shall achieve an FM or UL Class A fire rating.

# 2.2 MODIFIED BITUMEN ROOFING MEMBRANE

## A. Base ply:

### 1. Modified bitumen base sheet, glass fiber reinforced, minimum nominal 140 mil thickness; ASTM D 6222, Type I.

## B. Surfacing ply:

### 1. Modified bitumen granule-surfaced surfacing sheet, fire-resistant, triple reinforced (polyester and glass fiber), minimum nominal 160 mil thickness; ASTM D 6222, Type I.

a. Color: White, or as determined by Owner.

b. Initial Solar Reflectance: 0.26 or greater.

# 2.3 MODIFIED BITUMEN ROOFING FLASHING

## A. Base flashing ply:

### 1. Modified bitumen base sheet, glass fiber reinforced, minimum nominal 140 mil thickness; ASTM D 6222, Type I.

## B. Surfacing flashing ply:

### 1. Modified bitumen granule-surfaced surfacing sheet, fire-resistant, triple reinforced (polyester and glass fiber), minimum nominal 160 mil thickness; ASTM D 6222, Type I.

a. Color: White, or as determined by Owner.

b. Initial Solar Reflectance: 0.26 or greater.

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**NOTE TO SPECIFIER**

Two options are available for Article 2.4:

## *1. If the project is located in ASHRAE Climate Zones 1, 2, 3 or 4, a reflective roofing surface meeting the reflectivity requirements of DOE Energy Star is required per the USPS Roofing Design Standards. This option will be included in the Base Proposal; DELETE “(ALTERNATE)” from the Article title.*

## *2. If the project is located in an ASHRAE Climate Zones 5, 6 or 7, a reflective roofing surface meeting the reflectivity requirements of DOE Energy Star shall be added as an alternate. Do not edit Article 2.4.*

Determine the required outcome from the list above. Choose one option only. EDIT the item below, based on the options listed above. Re-letter/number paragraphs and sub-paragraphs after editing, if necessary.

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# 2.4 DOE ENERGY STAR INITIAL SOLAR REFLECTANCE REQUIREMENT (ALTERNATE)

## A. Provide a completed roofing system approved by the roofing membrane manufacturer, and meeting the Initial Solar Reflectance requirement of 0.65, minimum, as required by DOE Energy Star. The following product is acceptable to achieve this requirement:

### 1. Use of the specified surfacing plies meeting the requirements identified in Article 2.1, 2.2 and 2.3, and a field-applied acrylic elastomeric coating applied to the finished APP modified bitumen roofing membrane and flashing surfacing ply. The coating shall be approved for the use specified by the roofing membrane and coating manufacturers.

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**NOTE TO SPECIFIER**

If liquid-applied flashing is required for this project, do not edit Article 2.5. If liquid-applied flashing is not required for this project, DELETE Article 2.5. If necessary, re-letter/number paragraphs and sub-paragraphs after editing.

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# 2.5 LIQUID-APPLIED FLASHING

## A. Base and top coats:

### 1. Single or dual component, moisture-cured. Product approved by the roofing membrane manufacturer for use in the specified configuration.

## B. Reinforcing fabric:

### 1. Polyester-reinforced fabric. Product approved by the roofing membrane manufacturer for use in the specified configuration.

# 2.6 ADHESIVES, CEMENTS AND PRIMERS

## A. Cold adhesive: Product approved by the roofing membrane manufacturer.

## B. Flashing cement and roofing cement: Product compatible with APP Modified bitumen roofing and approved by the roofing membrane manufacturer.

##

## C. Asphalt primer: ASTM D 41.

# 2.7 FASTENERS

## A. Roofing membrane and flashing fasteners: Unless otherwise indicated, types as required by the roofing membrane manufacturer.

# 2.8 ROOFING FELTS

## A. For use at temporary overnight tie-ins: Modified bitumen base sheet, glass fiber reinforced, minimum nominal 140 mil thickness; ASTM D 6222, Type I.

## B. For use at roof sump flashings and elsewhere as may be indicated: Asphalt treated woven glass fabric, ASTM D 1668, Type I.

2.9 ROOF INSULATION

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***NOTE TO SPECIFIER***

*INSULATION TYPE OPTION 1, Polyisocyanurate foam insulation assemblies: Include the paragraphs below if the Specifier chooses Polyisocyanurate insulation.*

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A. Flat Roof Board Insulation: Polyisocyanurate Foam Insulation which meets or exceeds FS HH-I-1972/2, both faces covered with glass fiber felt; comply with FMG Standard 4450 Approval. (ASTM C1289, Type II – Class 1 – Grade 2)

1. Thermal Resistance: in service R-5.6 per inch of thickness in cooling conditions

2. Thermal Resistance: in service R-5.0 per inch of thickness in heating conditions

3. Compressive Strength: 20 PSI Minimum

4. Maximum Board Thickness is 2 inches.

5. Minimum Board Thickness is 1.5 inches on the base layer.

B. Tapered Polyisocyanurate Foam Insulation: Provide crickets, saddles, and tapered insulation of same material as second layer of insulation; taper to the following slopes:

1. Crickets and Saddles: 1/4 inch per foot or twice the slope of the roof, whichever is greater.

2. Insulation Installed to Counterslope Roof Structure: 1/2 inch to the foot, or twice slope of roof, whichever is greater.

C. Roof Curb Insulation: Polyisocyanurate foam; thickness to match wood nailer.

D. Tapered Insulation: Provide crickets, saddles, and tapered insulation of same material as second layer of insulation; taper to the following slopes:

1. Crickets and Saddles: 1/4 inch per foot or twice the slope of the roof, whichever is greater.

2. Insulation Installed to Counterslope Roof Structure: 1/2 inch to the foot, or twice slope of roof, whichever is greater.

E. Cover Board: 1/2-inch Factory Primed Glass Mat Gypsum Roof Board: ASTM C-1177. Zero flame spread and zero smoke developed per ASTM E84. Minimum 500 pounds per square inch compressive strength.

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***NOTE TO SPECIFIER***

*INSULATION TYPE OPTION 2, Extruded Polystyrene insulation assemblies: Include the paragraphs below if the Specifier chooses Extruded Polystyrene insulation.*

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A. Flat Roof Board Insulation: Extruded polystyrene board to ASTM C578, Type IV, rigid, closed cell type, with integral high density skin.

1. Thermal Resistance (ASTM C518): typical 5 year aged value of R-5 per 1 inch of thickness.

2. Compressive Strength (ASTM D1621): Minimum 25 psi.

3. Water Absorption (ASTM D2842): 0.7% by volume maximum.

4. Flame Spread/Smoke Developed Values (ASTM E84): 5/165.

B. Tapered Roof Board Insulation: Extruded polystyrene board to ASTM C578, Type IV, rigid, closed cell type, with integral high density skin.

1. Thermal Resistance (ASTM C518): typical 5 year aged value of R-5 per 1 inch of thickness.

2 Compressive Strength: Minimum 25 psi.

3. Water Absorption (ASTM D2842): 0.7% by volume maximum.

4. Flame Spread/Smoke Developed Values (ASTM E84): 5/165.

C. Cover Board: 1/4-inch Factory Primed Glass Mat Gypsum Roof Board: ASTM C-1177. Zero flame spread and zero smoke developed per ASTM E84. Minimum 500 pounds per square inch compressive strength.

2.10 ROOF INSULATION ASSEMBLIES

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***NOTE TO SPECIFIER***

*Use roof insulation systems as required by specific building location and Energy Calculations for specific building type and project requirements. Provide the minimum number of layers of rigid insulation recommended by the Manufacturer, not to be less than two layers. Modify the following options to comply with requirements.*

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A. Two layers of polyisocyanurate shall be used with staggered joints. Both layers may be loose laid and fastened with the same insulation fastener and plate.

B. Total thickness of insulation shall be calculated using as indicated on drawings.

2.11 ACCESSORIES

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***NOTE TO SPECIFIER***

*INSULATION ATTACHMENT OPTION 1, Mechanically attached insulation assemblies: Include the paragraphs below if the Specifier chooses mechanically attached insulation.*

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A. Roofing Insulation Fasteners: Fasteners shall be as tested and approved by FMG as part of the roofing system assembly.

1. Mechanical Fasteners for Insulation: Coated fasteners with plates appropriate for purpose intended and approved by Factory Mutual and supplied by roofing membrane manufacturer. Thickness of insulation and roofing membrane manufacturer’s deck penetration requirements shall determine the length of the fastener.

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***NOTE TO SPECIFIER***

*INSULATION ATTACHMENT OPTION 2, Adhered insulation assemblies: Include the paragraphs below if the Specifier chooses adhered insulation.*

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A. Roofing Insulation Adhesive: Insulation Adhesive shall be as tested and approved by FMG as part of the roofing system assembly.

1. Insulation Adhesive: [The specifier shall reseach the requirements with respect to Volitile Organtic Compounds and temperature limitations of project to complete this specification section. The completed section will dictate Standard VOC content insulation adhesive, Low VOC content insulation adhesive, OR No VOC content insulation adhesive.]

2. Specified adhesive shall be for purpose intended and approved by Factory Mutual and supplied by roofing membrane manufacturer.

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***NOTE TO SPECIFIER***

*End of INSULATION ATTACHMENT OPTIONS*

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***NOTE TO SPECIFIER***

*EDIT items in Article 2.12 to reflect actual project conditions and requirements. Re-letter/number paragraphs and sub-paragraphs after editing.*

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2.12 MISCELLANEOUS MATERIALS

A. Walkway pads: Product approved by the roofing manufacturer.

B. Splashblocks: Concrete; size as called for on drawings.

C. Pitch pan fill materials:

1. Non-shrink grout (for bottom fill): Quick-set, fast-drying grout; product acceptable to roofing manufacturer.

2. Pourable sealer (for top fill): Two-part pourable elastomeric sealer, product acceptable to roofing manufacturer.

D. Conduit and pipe supports:

1. For pipes with a diameter up to 6-inches:

a. Adjustable prefabricated support such as Pipe Pier 150 manufactured by Pipe Pier Support Systems, Hamel, MN, or approved equal.

b. Product approved by the roofing manufacturer for this application.

c. Product capable of accommodating the weight of the supported pipe at intervals recommended by the pipe support manufacturer.

2. For pipes with a diameter greater than 6-inches:

a. Product approved by the roofing manufacturer for this application.

b. Product capable of accommodating the weight of the supported pipe at intervals recommended by the pipe support manufacturer.

E. Pre-fabricated plumbing vent pipe extensions:

1. For use where necessary to achieve the 8-inch minimum flashing height:

a. Pre-fabricated plumbing vent extensions, such as Tubos Pre-Fabricated Pipe Extension, by Tubos, Inc., Clearwater, FL.

b. Product approved by the roofing manufacturer for this application.

c. Size and configuration of extension as necessary to match pipe diameter, providing the 8-inch minimum flashing height, and allowing for flashing as show on the drawings.

F. Self-adhering membrane (for use over parapet walls beneath coping caps, and at other locations indicated on the drawings): Product approved for use beneath sheet metal by the membrane manufacturer, and meeting the following criteria:

1. Meeting the requirements of ASTM D 1970.

2. Approved for use as an underlayment for standing seam sheet metal roofing.

3. A 40-mil minimum membrane thickness.

G. Roof hatch:

1. Roof hatch, such as “Type E” or “Type S”, manufactured by The Bilco Company, New Haven, CT, or approved equal.

a. Size and configuration.

b. Product approved by the roofing manufacturer for this application.

H. Extendable ladder-mounted safety post, such as “LadderUP Safety Post”, manufactured by The Bilco Company, New Haven, CT, or approved equal.

1. Size and configuration as necessary to accommodate existing ladder and roof hatch.

2. Product approved by the roofing manufacturer for this application.

I. Acrylic elastomeric coating (for use at roof penetrations and other locations indicated on the project drawings). Product approved for use by the membrane manufacturer for this application, and meeting the following criteria:

1. Meeting the requirements of ASTM D 6083.

2. White color.

J. Rooftop unit support curbs: Product such as “Pate Equipment Supports” manufactured by The Pate Company, Lombard, IL, or approved equal.

1. Size and configuration as necessary to accommodate rooftop unit.

2. Fabricated from 18 ga. galvanized steel, minimum, with welded seams; and a nominal 2-inch thick nailer affixed atop the curb support.

3. Fabricated to allow for a minimum flashing height of 8-inches, minimum.

4. Product approved by the roofing manufacturer for this application.

# PART 3 - EXECUTION

3.1 EXAMINATION

## A. Section 017300 - Execution: Verification of existing conditions before starting work.

B. Verification of Conditions: Verify that field measurements, surfaces, substrates and conditions are as required, and ready to receive Work.

1. Verify deck is clean and smooth, free of depressions, waves, or projections, properly sloped to drains, valleys, and eaves. Verify flutes of steel deck are evenly spaced at intersections.

2. Verify roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set, and nailing strips, and reglets are in place. Verify deck is supported and tightly secured.

3. Verify deck surfaces are dry and free of water, snow, and ice.

1. Report in writing to Contracting Officer prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.
2. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the USPS.

3.2 PREPARATION

A. Provide covers and other means of protection as necessary to protect building surfaces against damage during roofing work.

B. Where work shall continue over finished roof membrane, protect surfaces according to roofing membrane manufacturer’s recommendations.

3.3 ROOF INSULATION INSTALLATION

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**NOTE TO SPECIFIER**

INSULATION ATTACHMENT OPTION 1, Mechanically attached insulation assemblies: Include the paragraphs below if the Specifier chooses mechanically attached insulation.

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A. Lay insulation boards to moderate contact without forcing joints. Cut insulation to fit neatly to perimeter blocking and around protrusions through roof.

1. Gaps between insulation boards, nailers and penetrations of 1/4 inch or greater are not acceptable.

B. Place roof crickets and tapered thickness insulation to the required slope pattern in accordance with manufacturer's published instructions.

C. Mechanically Attached Installation:

1. Maximum insulation board dimension is 4 x 8 feet.

2. Place long edge of boards parallel to deck flutes, forming joint over solid bearing. Lay first layer insulation units with long edge joints continuous and end joints staggered.

3. Lay second and subsequent layers of insulation with both long side and end joints offset 6 inches from joints below.

4. Factory primed glass mat gypsum board and overlayered insulation may be loose laid and fastened with the same insulation fastener and plate in accordance with manufacturer’s approved assembly. Fastener and plate must be approved by the roof system manufacturer and installed at the required density to achieve the specified FMG [1A]-[90][105][120] system, in accordance with requirements of FMG Loss Prevention Data Sheet 1-29 for specified wind uplift requirements.

D. Apply no more insulation than can be waterproofed with roofing membrane in same day.

E. Mechanically attach a single layer of insulation to manufactured metal curbs.

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***NOTE TO SPECIFIER***

*INSULATION ATTACHMENT OPTION 2, Adhered insulation assemblies: Include the paragraphs below if the Specifier chooses adhered insulation.*

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A. Lay insulation boards to moderate contact without forcing joints. Cut insulation to fit neatly to perimeter blocking and around protrusions through roof.

1. Gaps between insulation boards, nailers and penetrations of 1/4 inch or greater are not acceptable.

B. Place roof crickets and tapered thickness insulation to the required slope pattern in accordance with manufacturer's published instructions.

C. Adhered Installation:

1. 4-foot x 4-foot maximum board size for insulation boards adhered to a substrate including successive layers.

2. Lay second and subsequent layers of insulation so that the insulation board’s joints are staggered vertically and offset from the underlying layers.

3. Factory primed glass mat gypsum board and overlayered insulation shall be adhered in accordance with the manufacture’s recommendations and submitted FM assembly number to achieve the specified FMG [1A]-[90][105][120] system, in accordance with requirements of FMG Loss Prevention Data Sheet 1-29 for specified wind uplift requirements.

D. Apply no more insulation than can be waterproofed with roofing membrane in same day.

E. Mechanically attach a single layer of insulation to manufactured metal curbs.

3.4 ROOFING MEMBRANE INSTALLATION

## A. Except as may be modified by these specifications and drawings, install roofing membrane in

## accordance with the requirements and recommendations of the roofing membrane manufacturer, using the manufacturer’s current printed instructions.

## B. Chalk lining: Beginning at the low points or drains, chalk line the cover board surface to serve as guides for the proper mopping and laying of the roofing membrane plies.

## C. Broom or press each ply into place, full width.

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**NOTE TO SPECIFIER**

Hot-air welding of roofing membrane base ply and surfacing ply seams, using a flameless welding machine, is required. Use of torches during roof replacement application is not allowed.

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D. Hot-air welded seams: A flameless welding machine must be used for field membrane seams. Hot-air weld base ply and surfacing ply seams. Do not use torches to weld seams.

## E. Install only as much roofing as can be completed in a work day, including flashing and detail work. All installed roofing shall be sealed to a watertight condition prior to leaving the site daily.

## F. Sequence roofing work to eliminate the use of installed roofing as a walkway, or as a storage platform for materials.

## G. Where wheeled or excessive traffic over new or existing roofing work is unavoidable, provide and use 3/4-inch plywood, set over a minimum of two-inch thick rigid board insulation to protect roofing components in place.

## H. Overnight tie-in: Care should be exercised to ensure that water does not flow beneath any completed sections of the roof by temporarily sealing the loose edge of the membrane at the end of each work day and when the weather is threatening. The roofing membrane manufacturer’s requirements should be followed closely.

## I. Remove debris from the roof daily prior to leaving the site. Inspect the site at ground level. Remove any roof replacement related debris from the ground.

J. Fire watch: Per local codes, provide a fire watch after completion of daily work.

# 3.5 BASE FLASHINGS

## A. Curb height: Unless otherwise indicated or not possible due to existing conditions encountered, provide an 8-inch minimum flashing height above the finished roofing surface. Refer to Section 061053 for wood blocking requirements related to raising of rooftop curbs.

## B. Ensure that all flashing substrates are suitable to receive new base flashing materials.

## C. Install base flashings at vertical walls and curbs in accordance with the roofing membrane manufacturer’s requirements and recommendations.

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**NOTE TO SPECIFIER**

Hot-air welding of flashing base ply and surfacing ply seams, using a flameless welding machine, is required. Use of torches during roof replacement application is not allowed.

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D. Hot-air welded seams: Using a heat gun, hot-air weld flashing base ply and surfacing ply seams. Do not use torches to weld seams.

## E. Secure the top edge of flashing as shown on the drawings, and In accordance with roofing membrane manufacturer recommendations and requirements. Seal the completed flashing top edge with a 3-course stripping of woven glass fabric and flashing cement.

## F. Fire watch: Per local codes, provide a fire watch after completion of daily work.

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***NOTE TO SPECIFIER***

*Two options are available for Article 3.6:*

*1. If the project is located in ASHRAE Climate Zones 1, 2, 3 or 4, a reflective roofing surface meeting the reflectivity requirements of DOE Energy Star is required per USPS Design Standards. This option will be included in the Base Proposal; DELETE “(ALTERNATE WORK)” from the Article title.*

*2. If the project is located in an ASHRAE Climate Zones 5, 6 or 7, a reflective roofing surface meeting the reflectivity requirements of DOE Energy Star shall be added as an alternate. Do not edit Article 3.6.*

*Determine the required outcome from the list above. Choose one option only. Edit the item below, based on the options listed above. Re-letter/number paragraphs and sub-paragraphs after editing, if necessary.*

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3.6 REFLECTIVE SURFACING INSTALLATION (ALTERNATE WORK)

A. Installation of field-applied acrylic elastomeric roof coating:

1. Prepare substrate in a manner that is acceptable to the roofing membrane and coating manufacturers. Substrate preparation includes, but is not limited to: removal of dirt and debris, repair of defects in the roof membrane and flashing, treatment of surface residue, treatment of areas of excessive ponding, and priming (if required by the roof coating manufacturer).

a. After substrate preparation work is complete, inspect all surface preparation work. Correct any identified defects prior to application of coating.

b. Inspect the areas adjacent to the work area for cars and other property that could be damaged by coating overspray. Prior to work start, remove or protect cars and other property that may be damaged by work activities.

c. Prior to work start, close any rooftop air intakes within and adjacent to the work area.

d. Follow manufacturer guidelines for rate of application and application procedures of the base and finish coats, as outlined in the written literature provided by the coating manufacturer.

e. Apply the coating following the requirements and recommendations of the roofing membrane and coating manufacturer. Install a minimum of two coats of acrylic elastomeric coating over the roof surface.

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**NOTE TO SPECIFIER**

If liquid-applied flashing is required for this project, do not edit Article 3.7. If liquid-applied flashing is not required for this project, DELETE Article 3.7. If necessary, re-letter/number paragraphs and sub-paragraphs after editing.

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# 3.7 LIQUID-APPLIED FLASHING

## A. At locations to receive liquid applied flashings, as indicated on the project drawings:

### 1. Follow the written instructions for application of liquid-applied flashing provided by the roofing membrane manufacturer.

### 2. Prepare the flashing substrate in a manner that is acceptable to the roofing membrane manufacturer. Substrate preparation includes, but is not limited to, removal of dirt and debris, repair of defects in the roof membrane and flashing, treatment of surface residue, treatment of areas of excessive ponding, and priming (if required by the roof coating manufacturer).

### 3. Apply the base coat of liquid applied flashing to the substrate.

### 4. Install required reinforcing mesh into the base coat.

### 5. Apply the top coat of liquid applied flashing over the reinforcing mesh and base coat. Extend the top coat over and beyond the reinforcing mesh.

### 6. At horizontal surfaces, broadcast granules over the completed flashing.

# 3.8 ROOF SUMP FLASHINGS

## A. Prior to installation of the base ply, install a three-course stripping of woven glass fabric and

## roofing cement over the cover board/insulation substrate.

## B. Ensure that the roofing membrane plies extend into the roof sump.

## C. Install a three-course stripping of woven glass fabric and roofing cement over the base ply.

## D. Install a lead sheet flashing over the base ply in the sump; refer to Section 076203. Prime both

## sides of the lead sheet prior to installation.

## E. Install modified bitumen flashing ply over the lead flashing sheet.

## F. Ensure that the roofing membrane base and surfacing plies, lead flashing sheet, and modified bitumen flashing ply extend under the clamping ring and into the drain bowl. Tightly secure the clamping ring.

# 3.9 SHEET METAL FLANGE STRIPPINGS

## A. At sheet metal flanges associated with tubular penetration, pitch pan and perimeter edge sheet metal fascia flashings:

### 1. Prime the top and bottom of the sheet metal flange. Allow the primer time to dry.

### 2. Set flange in a full bed of modified bitumen flashing cement.

### 3. Install strippings in accordance with the drawings and the requirements and recommendations of the modified bitumen roofing membrane manufacturer.

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***NOTE TO SPECIFIER***

*EDIT items in Article 3.10 to reflect actual project conditions and requirements. Re-letter/number paragraphs and sub-paragraphs after editing.*

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# 3.10 MISCELLANEOUS INSTALLATIONS/TREATMENTS

A. Install mechanical ventilator units in positions and secure to the curbs with EPDM-gasketed screws. Provide a minimum of one fastener on each side of the curb and a minimum of one fastener every 12-inches on center.

B. Connect all electrical, plumbing, gas line and ventilation connections required for mechanical units. Retain a qualified, licensed electrical subcontractor to connect electrical equipment. Retain a qualified, licensed mechanical subcontractor to connect gas lines and ventilation connections.

C. Walkway pads: Install walkway pads at locations indicated on drawings. Install the pads in accordance with the requirements and recommendations of the roofing manufacturer. Extend the pads a minimum of 4-inches in all directions beyond wood blocking.

D. Install splashblocks set on walkpads at locations indicated on the drawings.

E. Rooftop conduit and pipe supports:

1. Install adjustable prefabricated pipe supports at rooftop conduit and pipes.

2. Space pipe supports at intervals recommended by the support manufacturer, as determined by the diameter and weight of the conduit or pipe.

3. Separate the support from the roof surface by installing the support over roof walkway pads, installed as specified.

F. Pre-fabricated plumbing vent pipe extensions:

1. Refer to manufacturer requirements and recommendations for installation.

2. Prior to flashing installation, seal intersection of pipe extension and existing plumbing vent.

G. Install self-adhering underlayment beneath coping caps, and at other locations indicated on the drawings.

1. Refer to manufacturer requirements and recommendations for installation.

H. Roof hatch installation:

1. Provide wood nailers beneath roof hatch flanges, if necessary, to match insulation thickness.

2. Install roof hatch following the written instructions, recommendations, and requirements of the roof hatch manufacturer.

I. Extendable safety post installation:

1. Install new safety post following the written instructions, recommendations, and requirements of the roof hatch manufacturer.

J. Application of elastomeric coating to rooftop penetrations:

1. Prepare substrate in a manner that is acceptable to the coating manufacturer. Substrate preparation includes, but is not limited to: treatment of excessive gaps, repair of damaged or loose sheet metal components, repair of holes, cleaning of roof penetrations, treatment of surface rust, treatment of residual asphalt, and priming (if required by the roof coating manufacturer.

2. Coat the indicated penetrations following the recommendations and requirements of the coating manufacturer.

K. Installation of equipment support curbs:

1. Install support curbs where indicated on the project drawings. Flash curbs into the roof system as indicated on the project drawings.

2. Refer to manufacturer requirements and recommendations for installation.

3.11 MAINTENANCE INSTRUCTION

A. Provide on-site instruction to review the components of the system and detail any common troubleshooting or maintenance that is required to ensure normal performance of the roofing system.

B. Provide one complete set of installation details and manuals that will remain at the installed location.

3.12 CLEANING

A. Section 017300 - Execution: Requirements for cleaning.

B. Remove dirt, debris, and markings from finished surfaces. In areas where finished surfaces are soiled, consult roofing membrane manufacturer for cleaning advice and comply with their instruction.

C. Replace defaced or disfigured finishes caused by Work of this Section.

3.13 PROTECTION

A. Where construction traffic must continue over finished roof installation, protect surfaces in manner recommended by roofing system manufacturer to protect Manufacturer's Warranty.

END OF SECTION

USPS MPF Specification Last Revised: 10/1/2022