

Facilities Design  
and Construction

**ADDENDUM No. 1**  
**TO THE**  
**CONTRACT DOCUMENTS**  
**JULY 17, 2024**

**PROJECT NO. 9557420**  
**MIND/MIND LAB ROOF REPAIR/REPLACE**

## GENERAL

This addendum forms a part of the Contract Documents and modifies the original Bidding Documents dated July 2024, and consists of pages AD1-1, Specifications Section **075416**. The following changes, additions and/or deletions shall be made to the following documents: all other conditions shall remain the same.

## ITEM NO. II – SPECIFICATIONS

### 1. SECTION 075416 – KEE Roofing (On Original Bid Specification Document REV-0)

Page 075416-6, Item 2.5, E – **DELETE** - Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening components to substrate, and acceptable to membrane roofing system manufacturer.

Page 075416-7, Item 2.7, C – **DELETE** - Insulation Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roof insulation and cover boards to substrate, and acceptable to roofing system manufacturer.

Page 075416-8 Item 3.4, D – **DELETE** - Mechanically Fastened Insulation: Install each layer of insulation and secure to deck through the lightweight insulating concrete using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.

Page 075416-9 Item 3.4, D – 1 **DELETE** - Fasten insulation to resist uplift pressure at corners, perimeter, and field of roof.

Page 075416-9 Item 3.5 E – **DELETE** - In addition to adhering, mechanically fasten membrane roofing securely at terminations, penetrations, and perimeter of roofing.

DocuSigned by:

*Atosa Abedini*

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Atosa Abedini – Project Manager  
Facilities Design & Construction  
UC Davis Health

## **SECTION 075416 KEE ROOFING**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

##### **A. Section Includes:**

1. Adhered thermoplastic KEE roofing system on a prepared existing roof substrate, including:
2. Roof insulation.
3. Roof insulation cover board.
4. Walkway material.
5. Vapor extracting vents

##### **B. Related Sections:**

1. Division 07 Section 07600 " Flashing and Sheet Metal " for shop-formed sheet metal items including roof drainage system items, roof penetration flashings, base and counterflashings and reglets.
2. Division 07 Section "Joint Sealants" for joint sealants, joint fillers, and joint preparation.

##### **C. Alternates: Refer to Division 01 Section "Alternates" for description of Work in this Section affected by alternates.**

##### **D. Allowances: Refer to Division 01 Section "Allowances" for description of Work in this Section affected by allowances.**

#### **1.2 DEFINITIONS**

##### **A. Roofing Terminology: Refer to ASTM D1079 "Standard Terminology Relating to Roofing and Waterproofing" and glossary in applicable edition of NRCA's "The NRCA Roofing Manual: Membrane Roof Systems" for definition of terms related to roofing work in this Section.**

#### **1.3 PREINSTALLATION MEETINGS**

##### **A. Preinstallation Roofing Conference: Conduct conference at Project site.**

1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
2. Review drawings and specifications.
3. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
4. Review and finalize construction schedule and verify availability of materials,

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Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

5. Examine substrate conditions and finishes for compliance with requirements, including flatness and fastening.
6. Review structural loading limitations of roof deck during and after roofing.
7. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
8. Review governing regulations and requirements for insurance and certificates if applicable.
9. Review temporary protection requirements for roofing system during and after installation.
10. Review roof observation and repair procedures after roofing installation.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. SDS: For each type of product indicated.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Contractor's Product Certificate: Submit certificate, indicating products intended for Work of this Section, including product names and numbers and manufacturers' names, with statement indicating that products to be provided meet the requirements of the Contract Documents.
- B. Qualification Data: For Installer, Manufacturer and Roofing Inspector.
  1. Include letter from Manufacturer written for this Project indicating approval of Installer.
- C. Warranties: Unexecuted sample copies of special warranties.

#### 1.6 CLOSEOUT SUBMITTALS

- A. Executed copies of warranties.
- B. Maintenance Data: To include in maintenance manuals.

#### 1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and certified by manufacturer, including a full-time on-site supervisor with a minimum of five years' experience installing products comparable to those specified, able to communicate verbally with Contractor, Architect, and employees, and qualified by the manufacturer to install manufacturer's product and furnish warranty of type specified.
- B. Manufacturer Qualifications: Approved manufacturer listed in this Section, UL listed for roofing systems comparable to that specified for this Project, with minimum five years' experience in manufacture of thermoplastic roof membrane products in successful use in similar applications.
- C. Roofing Inspector Qualifications: A technical representative of manufacturer not engaged in the sale of products and experienced in the installation and maintenance of the specified

roofing system, qualified to perform roofing observation and inspection specified in Field Quality Control Article, to determine Installer's compliance with the requirements of this Project, and approved by the manufacturer to issue warranty certification. The Roofing Inspector shall be the following:

1. An authorized full-time technical employee of the manufacturer.
- D. Manufacturer's Installation Instructions: Obtain and maintain on-site access to manufacturer's written recommendations and instructions for installation of products.

## 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
- D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

## 1.9 PROJECT / FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.
- B. Daily Protection: Coordinate installation of roofing so insulation and other components of roofing system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.
1. Provide tie-offs at end of each day's work to cover exposed roofing and insulation with a course of roofing sheet securely in place with joints and edges sealed.
  2. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing.
  3. Remove temporary plugs from roof drains at end of each day.
  4. Remove and discard temporary seals before beginning work on adjoining roofing.

## 1.10 WARRANTY

- A. Manufacturer's Warranty: Roof System Manufacturer's standard form in which Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within warranty period, as follows.

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1. Form of Warranty: Manufacturer's standard warranty form.
  2. Scope of Warranty: Work of this Section and including sheet metal details and termination details installed by the roof system Installer and approved by the Roof System Manufacturer.
  3. Warranty Period: 30 years from date of completion.
- B. Manufacturer Inspection Services: By manufacturer's technical representative, to report maintenance responsibilities to Owner necessary for preservation of Owner's warranty rights. The cost of manufacturer's inspections is included in the Contract Sum.
1. Inspections to occur in following years: 2, 5, 10, 15, 20, 25 following completion.
- C. Installer Warranty: Installer's warranty signed by Installer, as follows.
1. Form of Warranty: Form acceptable to Roofing Manufacturer and Owner.
  2. Scope of Warranty: Work of this Section.
  3. Warranty Period: 2 years from date of completion.

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Basis of Design: The roof system specified in this Section is based upon products of Tremco, Inc., Beachwood, OH, (800) 562-2728, [www.tremcoroofing.com](http://www.tremcoroofing.com) that are named in other Part 2 articles. Provide specified products or equal.
- B. Source Limitations: Obtain components for roofing system from same manufacturer as membrane roofing or manufacturer approved by membrane roofing manufacturer.

### **2.2 PERFORMANCE REQUIREMENTS**

- A. General Performance: Installed membrane roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Membrane roofing and base flashings shall remain watertight.
1. Accelerated Weathering: Roofing system shall withstand 10,000 hours of exposure when tested according to ASTM G152, ASTM G154, or ASTM G155.
  2. Impact Resistance: Roof membrane shall resist impact damage when tested according to ASTM D3746/D3746M, ASTM D4272/D4272M, or the "Resistance to Foot Traffic Test" in FM Approvals 4470.
- B. Exterior Fire-Test Exposure: ASTM E108, Class A; for application and roof slopes indicated, as determined by testing identical membrane roofing materials by a qualified testing agency. Materials shall be identified with appropriate markings of applicable testing agency.
- C. Energy Performance: Roofing system shall have an initial solar reflectance index of not less than 0.70 and an emissivity of not less than 0.75 when tested according to CRRC-1.

## 2.3 MATERIALS, GENERAL

- A. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roof membrane manufacturer based on testing and field experience.

## 2.4 THERMOPLASTIC MEMBRANE MATERIALS

### A. KEE Roof Membrane:

1. Thermoplastic Ketone Ethylene Ester (KEE) coated polyester fabric-reinforced fleece-backed sheet, ASTM D6754 .
  - a. Basis of design product: Tremco, TremPly KEE FB Single Ply Roof Membrane.
  - b. Breaking Strength, minimum, ASTM D751: Machine direction, 500 lbf (87 kN/m); Cross machine direction 400 lbf (70 kN/m).
  - c. Tear Strength, minimum, ASTM D751: Machine direction, 125 lbf (22 kN/m); Cross machine direction (145 lbf (25 kN/m).
  - d. Elongation at Break, ASTM D751: 20 percent.
  - e. Dynamic Impact/Puncture Resistance, ASTM D5635: Pass.
  - f. Minimum Membrane Thickness, nominal, less backing, ASTM D751: 60 mils (1.5 mm).
  - g. Thickness over fiber, optical method: 0.016 inches.
  - h. Accelerated Weathering, ASTM G155 and ASTM G154: Not greater than 5,000 hr., no cracking or crazing.
  - i. Abrasion Resistance, ASTM D3389: Not greater than 2,000 cycles, H-18 wheel, 1,000 g load.
  - j. Color: Grey.

- B. Sheet Flashing: Manufacturer's standard, smooth-backed, sheet flashing of same material, type, reinforcement, thickness and color as KEE roof membrane.

## 2.5 AUXILIARY ROOFING MATERIALS

- A. General: Auxiliary membrane roofing materials recommended by roofing system manufacturer for intended use, and compatible with membrane roofing.
  1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
  2. Adhesives and sealants that are not on the exterior side of weather barrier shall comply with the testing and product requirements of the California Department of Public Health's (formerly, the California Department of Health Services') "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- B. Membrane Bonding Adhesive:
  1. Bonding adhesive, waterborne low-VOC, for bonding KEE fleece-backed single ply membranes and flashings to substrates.

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- a. Basis of design product: Tremco, TremPly KEE FB WBII Bonding Adhesive.
  - b. VOC, maximum, ASTM D3960: 153 g/L.
- C. Flashing Membrane Adhesive:
  - 1. Bonding adhesive, solvent based fast drying, VOC-compliant, for bonding KEE smooth-backed single ply membranes and flashings to substrates.
    - a. Basis of design product: Tremco, TremPly KEE LV Bonding Adhesive.
    - b. VOC, maximum, ASTM D 3960: 200 g/L.
- D. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch (25 mm by 3 mm) thick; with anchors..
- E. Joint Sealant: Elastomeric joint sealant compatible with roofing materials, with movement capability appropriate for application.
  - 1. Joint Sealant, Polyurethane: ASTM C920, Type S, Grade NS, Class 50 single-component moisture curing sealant, formulated for compatibility and use in dynamic and static joints; paintable.
    - a. Basis of design product: Tremco, TremSEAL Pro.
    - b. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 40 g/L.
    - c. Hardness, Shore A, ASTM C661: 40.
    - d. Adhesion to Concrete, ASTM C794: 35 pli.
    - e. Tensile Strength, ASTM D412: 350 psi (2410 kPa).
    - f. Color: White.
- F. Prefabricated Pipe Flashings: As recommended by roof membrane manufacturer.
- G. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.

## 2.6 ROOF INSULATION MATERIALS

- A. General: Preformed roof insulation boards manufactured or approved by roofing manufacturer, selected from insulation manufacturer's standard sizes, suitable for application, and of thicknesses indicated.
- B. Roof Insulation: Provide roof insulation product in thicknesses indicated in Part 3 as follows:
  - 1. Board Insulation, Polyisocyanurate: CFC- and HCFC- free, with recycled content glass-fiber mat facer on both major surfaces, ASTM C1289 Type II Class 1.
    - a. Basis of design product: Hunter Insulation.
    - b. Compressive Strength, ASTM D1621: Grade 2: 20 psi (138 kPa).
    - c. Conditioned Thermal Resistance at 75 deg. F (24 deg. C): 14.4 at 2.5 inches (50.8 mm) thick.

## 2.7 ROOF INSULATION ACCESSORIES

### A. Cover Board:

1. Gypsum panel, cellulosic fiber reinforced, water-resistant, ASTM C1278/C1278M.
  - a. Basis of design product: USG Securock.
  - b. Thickness: 1/2 inch (13 mm).

### B. Roof Cover Board Adhesive:

1. Urethane adhesive, bead-applied, low-rise two-component solvent-free low odor, formulated to adhere roof insulation to substrate.
  - a. Basis of design product: Tremco, Low Rise Foam Insulation Adhesive.
  - b. Flame Spread Index, ASTM E84: 10.
  - c. Smoke Developed Index, ASTM E84: 30.
  - d. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 0 g/L.
  - e. Tensile Strength, minimum, ASTM D412: 250 psi (1720 kPa).
  - f. Peel Adhesion, minimum, ASTM D903: 17 lbf/in (2.50 kN/m).
  - g. Flexibility, 70 deg. F (39 deg. C), ASTM D816: Pass.

### C. Air Vent/Vapor Extractor: Supply and installation of Italprofi Air Vent/Vapour extractor or similar. Made of UV stabilized KEE or compatible, complete with anti-insect and protection ring for ventilation of vapors between the substructure and the membrane.

## 2.8 WALKWAY MATERIALS

### A. Walkway Material:

1. Walkway roll, reinforced PVC/TPA membrane roll with serrated slip-resistant surface, fabricated for heat welding to compatible PVC/TPA membrane surface.
  - a. Basis of design product: Tremco, TPA Walkway Roll.
  - b. Roll Size: 36 inches by 60 foot (914 mm by 18.3 m).
  - c. Thickness / Color: Gray, 0.072 inch (2 mm).
  - d. Tensile, Grab ASTM D751: 200 lbf (890 N).
  - e. Tear Strength, Tongue : 45 lbf (200N).
  - f. Low Temp Flex: -40 deg F. (-40 deg C.).

## PART 3 - EXECUTION

### 3.1 EXAMINATION

#### A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:

1. Verify that roof openings and penetrations are in place and curbs are set and braced



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and that roof drain bodies are securely clamped in place.

2. Verify that wood cants, blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
3. Existing Prepared Roof Substrate: Verify that existing insulation and substrate is sound and dry. Refer to requirements of Division 07 Section "Preparation for Re-Roofing."
4. Lightweight Insulating Concrete Roof Deck: Verify that deck is sound and dry and securely fastened with no projecting fasteners and with no adjacent units in excess of 1/16 inch (1.6 mm) out of plane relative to adjoining deck.
5. Verify that existing insulation and substrate is sound and dry.

- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.
- C. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

### 3.3 INSTALLATION, GENERAL

- A. Install roofing system in accordance with manufacturer's written instructions and approved details.
- B. NRCA Installation Details: Install roofing system in accordance with applicable NRCA Manual Plates and NRCA recommendations; modify as required to comply with manufacturer's approved details and perimeter fastening requirements of FM Global references if applicable.

### 3.4 INSULATION INSTALLATION

- A. Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
- B. Install new insulation as specified on the plans.
- C. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.
- D. Fully Adhered Insulation: Fully adhere each layer of insulation and secure to deck designed for fastening specified board-type roof insulation to deck type.
- E. Cover Boards: Install cover boards over insulation and existing built-up roof system with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches (150 mm) in each direction. Loosely butt cover boards together.

1. Secure cover boards to resist uplift pressure at corners, perimeter, and field of roof.
2. Adhere cover boards by setting in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining cover board in place.

### 3.5 ADHERED MEMBRANE ROOFING INSTALLATION

- A. Adhere membrane roofing over area to receive roofing and install according to membrane roofing system manufacturer's written instructions.
- B. Start installation of membrane roofing in presence of membrane roofing system manufacturer's technical personnel.
- C. Accurately align membrane roofing and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- D. Water-Based Bonding Adhesive: Apply to substrate at rate required by manufacturer. Install membrane immediately into adhesive, avoiding any air entrapment; do not allow adhesive to dry. Roll membrane into wet adhesive. Do not apply adhesive to splice area of membrane.
- E. Apply membrane roofing with side laps shingled with slope of roof deck where possible.
- F. Welded Seams: Clean seam areas, overlap membrane roofing, and hot-air weld side and end laps of membrane roofing and sheet flashings according to manufacturer's written instructions to ensure a watertight seam installation.
  1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of sheet membrane.
  2. Verify field strength of seams a minimum of twice daily and repair seam sample areas.
  3. Repair tears, voids, and lapped seams in roofing that does not comply with requirements.
- G. Spread sealant bed over deck drain flange at roof drains and securely seal membrane roofing in place with clamping ring.
- H. Install membrane roofing and auxiliary materials to tie in nightly to existing roofing to maintain weathertightness of transition.

### 3.6 BASE FLASHING INSTALLATION

- A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.
- B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply to seam area of flashing.
- C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.
- D. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.
- E. Seal top termination of base flashing with a metal termination bar and a continuous bead of joint sealant.

### 3.7 WALKWAY INSTALLATION

- A. Flexible Walkways: Install walkway products in locations indicated. Heat weld to substrate or adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

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### 3.8 FIELD QUALITY CONTROL

- A. Roofing Manufacturer: Manufacturer to provide site visits 2-3 days per week for the project duration. Provide written reports with photos and distribute to the project stakeholders.
- B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.
- C. Repair or remove and replace components of membrane roofing system where inspections indicate that they do not comply with specified requirements.

### 3.9 PROTECTING AND CLEANING

- A. Correct deficiencies in or remove membrane roofing system that does not comply with requirements; repair substrates; and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- B. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

**END OF SECTION**

**SECTION 075416  
KEE ROOFING**

**PART 1 - GENERAL**

**1.1 SUMMARY**

**A. Section Includes:**

1. Adhered thermoplastic KEE roofing system on a prepared existing roof substrate, including:
2. Roof insulation.
3. Roof insulation cover board.
4. Walkway material.
5. Vapor extracting vents

**B. Related Sections:**

1. Division 07 Section 07600 " Flashing and Sheet Metal " for shop-formed sheet metal items including roof drainage system items, roof penetration flashings, base and counterflashings and reglets.
2. Division 07 Section "Joint Sealants" for joint sealants, joint fillers, and joint preparation.

**C. Alternates:** Refer to Division 01 Section "Alternates" for description of Work in this Section affected by alternates.

**D. Allowances:** Refer to Division 01 Section "Allowances" for description of Work in this Section affected by allowances.

**1.2 DEFINITIONS**

**A. Roofing Terminology:** Refer to ASTM D1079 "Standard Terminology Relating to Roofing and Waterproofing" and glossary in applicable edition of NRCA's "The NRCA Roofing Manual: Membrane Roof Systems" for definition of terms related to roofing work in this Section.

**1.3 PREINSTALLATION MEETINGS**

**A. Preinstallation Roofing Conference:** Conduct conference at Project site.

1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
2. Review drawings and specifications.
3. Review methods and procedures related to roofing installation, including manufacturer's written instructions.

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4. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
5. Examine substrate conditions and finishes for compliance with requirements, including flatness and fastening.
6. Review structural loading limitations of roof deck during and after roofing.
7. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
8. Review governing regulations and requirements for insurance and certificates if applicable.
9. Review temporary protection requirements for roofing system during and after installation.
10. Review roof observation and repair procedures after roofing installation.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. SDS: For each type of product indicated.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Contractor's Product Certificate: Submit certificate, indicating products intended for Work of this Section, including product names and numbers and manufacturers' names, with statement indicating that products to be provided meet the requirements of the Contract Documents.
- B. Qualification Data: For Installer, Manufacturer and Roofing Inspector.
  1. Include letter from Manufacturer written for this Project indicating approval of Installer.
- C. Warranties: Unexecuted sample copies of special warranties.

#### 1.6 CLOSEOUT SUBMITTALS

- A. Executed copies of warranties.
- B. Maintenance Data: To include in maintenance manuals.

#### 1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and certified by manufacturer, including a full-time on-site supervisor with a minimum of five years' experience installing products comparable to those specified, able to communicate verbally with Contractor, Architect, and employees, and qualified by the manufacturer to install manufacturer's product and furnish warranty of type specified.
- B. Manufacturer Qualifications: Approved manufacturer listed in this Section, UL listed for roofing systems comparable to that specified for this Project, with minimum five years' experience in manufacture of thermoplastic roof membrane products in successful use in similar applications.
- C. Roofing Inspector Qualifications: A technical representative of manufacturer not engaged

in the sale of products and experienced in the installation and maintenance of the specified roofing system, qualified to perform roofing observation and inspection specified in Field Quality Control Article, to determine Installer's compliance with the requirements of this Project, and approved by the manufacturer to issue warranty certification. The Roofing Inspector shall be the following:

1. An authorized full-time technical employee of the manufacturer.
- D. Manufacturer's Installation Instructions: Obtain and maintain on-site access to manufacturer's written recommendations and instructions for installation of products.

#### 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
- D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

#### 1.9 PROJECT / FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.
- B. Daily Protection: Coordinate installation of roofing so insulation and other components of roofing system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.
1. Provide tie-offs at end of each day's work to cover exposed roofing and insulation with a course of roofing sheet securely in place with joints and edges sealed.
  2. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing.
  3. Remove temporary plugs from roof drains at end of each day.
  4. Remove and discard temporary seals before beginning work on adjoining roofing.

#### 1.10 WARRANTY

- A. Manufacturer's Warranty: Roof System Manufacturer's standard form in which

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Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within warranty period, as follows.

1. Form of Warranty: Manufacturer's standard warranty form.
  2. Scope of Warranty: Work of this Section and including sheet metal details and termination details installed by the roof system Installer and approved by the Roof System Manufacturer.
  3. Warranty Period: 30 years from date of completion.
- B. Manufacturer Inspection Services: By manufacturer's technical representative, to report maintenance responsibilities to Owner necessary for preservation of Owner's warranty rights. The cost of manufacturer's inspections is included in the Contract Sum.
1. Inspections to occur in following years: 2, 5, 10, 15, 20, 25 following completion.
- C. Installer Warranty: Installer's warranty signed by Installer, as follows.
1. Form of Warranty: Form acceptable to Roofing Manufacturer and Owner.
  2. Scope of Warranty: Work of this Section.
  3. Warranty Period: 2 years from date of completion.

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Basis of Design: The roof system specified in this Section is based upon products of Tremco, Inc., Beachwood, OH, (800) 562-2728, [www.tremcoroofing.com](http://www.tremcoroofing.com) that are named in other Part 2 articles. Provide specified products or equal.
- B. Source Limitations: Obtain components for roofing system from same manufacturer as membrane roofing or manufacturer approved by membrane roofing manufacturer.

### **2.2 PERFORMANCE REQUIREMENTS**

- A. General Performance: Installed membrane roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Membrane roofing and base flashings shall remain watertight.
  1. Accelerated Weathering: Roofing system shall withstand 10,000 hours of exposure when tested according to ASTM G152, ASTM G154, or ASTM G155.
  2. Impact Resistance: Roof membrane shall resist impact damage when tested according to ASTM D3746/D3746M, ASTM D4272/D4272M, or the "Resistance to Foot Traffic Test" in FM Approvals 4470.
- B. Exterior Fire-Test Exposure: ASTM E108, Class A; for application and roof slopes indicated, as determined by testing identical membrane roofing materials by a qualified testing agency. Materials shall be identified with appropriate markings of applicable testing agency.

- C. Energy Performance: Roofing system shall have an initial solar reflectance index of not less than 0.70 and an emissivity of not less than 0.75 when tested according to CRRC-1.

## 2.3 MATERIALS, GENERAL

- A. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roof membrane manufacturer based on testing and field experience.

## 2.4 THERMOPLASTIC MEMBRANE MATERIALS

- A. KEE Roof Membrane:

1. Thermoplastic Ketone Ethylene Ester (KEE) coated polyester fabric-reinforced fleece-backed sheet, ASTM D6754 .
  - a. Basis of design product: Tremco, TremPly KEE FB Single Ply Roof Membrane.
  - b. Breaking Strength, minimum, ASTM D751: Machine direction, 500 lbf (87 kN/m); Cross machine direction 400 lbf (70 kN/m).
  - c. Tear Strength, minimum, ASTM D751: Machine direction, 125 lbf (22 kN/m); Cross machine direction (145 lbf (25 kN/m).
  - d. Elongation at Break, ASTM D751: 20 percent.
  - e. Dynamic Impact/Puncture Resistance, ASTM D5635: Pass.
  - f. Minimum Membrane Thickness, nominal, less backing, ASTM D751: 60 mils (1.5 mm).
  - g. Thickness over fiber, optical method: 0.016 inches.
  - h. Accelerated Weathering, ASTM G155 and ASTM G154: Not greater than 5,000 hr., no cracking or crazing.
  - i. Abrasion Resistance, ASTM D3389: Not greater than 2,000 cycles, H-18 wheel, 1,000 g load.
  - j. Color: Grey.

- B. Sheet Flashing: Manufacturer's standard, smooth-backed, sheet flashing of same material, type, reinforcement, thickness and color as KEE roof membrane.

## 2.5 AUXILIARY ROOFING MATERIALS

- A. General: Auxiliary membrane roofing materials recommended by roofing system manufacturer for intended use, and compatible with membrane roofing.
  1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
  2. Adhesives and sealants that are not on the exterior side of weather barrier shall comply with the testing and product requirements of the California Department of Public Health's (formerly, the California Department of Health Services') "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."



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B. Membrane Bonding Adhesive:

1. Bonding adhesive, waterborne low-VOC, for bonding KEE fleece-backed single ply membranes and flashings to substrates.
  - a. Basis of design product: Tremco, TremPly KEE FB WBII Bonding Adhesive.
  - b. VOC, maximum, ASTM D3960: 153 g/L.

C. Flashing Membrane Adhesive:

1. Bonding adhesive, solvent based fast drying, VOC-compliant, for bonding KEE smooth-backed single ply membranes and flashings to substrates.
  - a. Basis of design product: Tremco, TremPly KEE LV Bonding Adhesive.
  - b. VOC, maximum, ASTM D 3960: 200 g/L.

D. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch (25 mm by 3 mm) thick; with anchors..

E. Joint Sealant: Elastomeric joint sealant compatible with roofing materials, with movement capability appropriate for application.

1. Joint Sealant, Polyurethane: ASTM C920, Type S, Grade NS, Class 50 single-component moisture curing sealant, formulated for compatibility and use in dynamic and static joints; paintable.
  - a. Basis of design product: Tremco, TremSEAL Pro.
  - b. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 40 g/L.
  - c. Hardness, Shore A, ASTM C661: 40.
  - d. Adhesion to Concrete, ASTM C794: 35 pli.
  - e. Tensile Strength, ASTM D412: 350 psi (2410 kPa).
  - f. Color: White.

F. Prefabricated Pipe Flashings: As recommended by roof membrane manufacturer.

G. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.

## 2.6 ROOF INSULATION MATERIALS

A. General: Preformed roof insulation boards manufactured or approved by roofing manufacturer, selected from insulation manufacturer's standard sizes, suitable for application, and of thicknesses indicated.

B. Roof Insulation: Provide roof insulation product in thicknesses indicated in Part 3 as follows:

1. Board Insulation, Polyisocyanurate: CFC- and HCFC- free, with recycled content glass-fiber mat facer on both major surfaces, ASTM C1289 Type II Class 1.

- a. Basis of design product: Hunter Insulation.
- b. Compressive Strength, ASTM D1621: Grade 2: 20 psi (138 kPa).
- c. Conditioned Thermal Resistance at 75 deg. F (24 deg. C): 14.4 at 2.5 inches (50.8 mm) thick.

## 2.7 ROOF INSULATION ACCESSORIES

### A. Cover Board:

- 1. Gypsum panel, cellulosic fiber reinforced, water-resistant, ASTM C1278/C1278M.
  - a. Basis of design product: USG Securock.
  - b. Thickness: 1/2 inch (13 mm).

### B. Roof Cover Board Adhesive:

- 1. Urethane adhesive, bead-applied, low-rise two-component solvent-free low odor, formulated to adhere roof insulation to substrate.
  - a. Basis of design product: Tremco, Low Rise Foam Insulation Adhesive.
  - b. Flame Spread Index, ASTM E84: 10.
  - c. Smoke Developed Index, ASTM E84: 30.
  - d. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 0 g/L.
  - e. Tensile Strength, minimum, ASTM D412: 250 psi (1720 kPa).
  - f. Peel Adhesion, minimum, ASTM D903: 17 lbf/in (2.50 kN/m).
  - g. Flexibility, 70 deg. F (39 deg. C), ASTM D816: Pass.

- C. Air Vent/Vapor Extractor: Supply and installation of Italprofili Air Vent/Vapour extractor or similar. Made of UV stabilized KEE or compatible, complete with anti-insect and protection ring for ventilation of vapors between the substructure and the membrane.

## 2.8 WALKWAY MATERIALS

### A. Walkway Material:

- 1. Walkway roll, reinforced PVC/TPA membrane roll with serrated slip-resistant surface, fabricated for heat welding to compatible PVC/TPA membrane surface.
  - a. Basis of design product: Tremco, TPA Walkway Roll.
  - b. Roll Size: 36 inches by 60 foot (914 mm by 18.3 m).
  - c. Thickness / Color: Gray, 0.072 inch (2 mm).
  - d. Tensile, Grab ASTM D751: 200 lbf (890 N).
  - e. Tear Strength, Tongue : 45 lbf (200N).
  - f. Low Temp Flex: -40 deg F. (-40 deg C.).

## PART 3 - EXECUTION

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### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
  - 1. Verify that roof openings and penetrations are in place and curbs are set and braced and that roof drain bodies are securely clamped in place.
  - 2. Verify that wood cants, blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
  - 3. Existing Prepared Roof Substrate: Verify that existing insulation and substrate is sound and dry. Refer to requirements of Division 07 Section "Preparation for Re-Roofing."
  - 4. Lightweight Insulating Concrete Roof Deck: Verify that deck is sound and dry and securely fastened with no projecting fasteners and with no adjacent units in excess of 1/16 inch (1.6 mm) out of plane relative to adjoining deck.
  - 5. Verify that existing insulation and substrate is sound and dry.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.
- C. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

### 3.3 INSTALLATION, GENERAL

- A. Install roofing system in accordance with manufacturer's written instructions and approved details.
- B. NRCA Installation Details: Install roofing system in accordance with applicable NRCA Manual Plates and NRCA recommendations; modify as required to comply with manufacturer's approved details and perimeter fastening requirements of FM Global references if applicable.

### 3.4 INSULATION INSTALLATION

- A. Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
- B. Install new insulation as specified on the plans.
- C. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.

- D. Fully Adhered Insulation: Fully adhere each layer of insulation and secure to deck designed for fastening specified board-type roof insulation to deck type.
- E. Cover Boards: Install cover boards over insulation and existing built-up roof system with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches (150 mm) in each direction. Loosely butt cover boards together.
  - 1. Secure cover boards to resist uplift pressure at corners, perimeter, and field of roof.
  - 2. Adhere cover boards by setting in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining cover board in place.

### 3.5 ADHERED MEMBRANE ROOFING INSTALLATION

- A. Adhere membrane roofing over area to receive roofing and install according to membrane roofing system manufacturer's written instructions.
- B. Start installation of membrane roofing in presence of membrane roofing system manufacturer's technical personnel.
- C. Accurately align membrane roofing and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- D. Water-Based Bonding Adhesive: Apply to substrate at rate required by manufacturer. Install membrane immediately into adhesive, avoiding any air entrapment; do not allow adhesive to dry. Roll membrane into wet adhesive. Do not apply adhesive to splice area of membrane.
- E. Apply membrane roofing with side laps shingled with slope of roof deck where possible.
- F. Welded Seams: Clean seam areas, overlap membrane roofing, and hot-air weld side and end laps of membrane roofing and sheet flashings according to manufacturer's written instructions to ensure a watertight seam installation.
  - 1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of sheet membrane.
  - 2. Verify field strength of seams a minimum of twice daily and repair seam sample areas.
  - 3. Repair tears, voids, and lapped seams in roofing that does not comply with requirements.
- G. Spread sealant bed over deck drain flange at roof drains and securely seal membrane roofing in place with clamping ring.
- H. Install membrane roofing and auxiliary materials to tie in nightly to existing roofing to maintain weathertightness of transition.

### 3.6 BASE FLASHING INSTALLATION

- A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.
- B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply to seam area of flashing.
- C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.
- D. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.

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- E. Seal top termination of base flashing with a metal termination bar and a continuous bead of joint sealant.

### 3.7 WALKWAY INSTALLATION

- A. Flexible Walkways: Install walkway products in locations indicated. Heat weld to substrate or adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

### 3.8 FIELD QUALITY CONTROL

- A. Roofing Manufacturer: Manufacturer to provide site visits 2-3 days per week for the project duration. Provide written reports with photos and distribute to the project stakeholders.
- B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.
- C. Repair or remove and replace components of membrane roofing system where inspections indicate that they do not comply with specified requirements.

### 3.9 PROTECTING AND CLEANING

- A. Correct deficiencies in or remove membrane roofing system that does not comply with requirements; repair substrates; and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- B. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

**END OF SECTION**