

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General Conditions and Division 1 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. This Section includes KEE single-ply roofing and related work as shown and specified.

**SCOPE OF WORK:**

1. Properly remove and dispose of the existing roof system
2. Replace all dry root wood decking, wood fascia, wood nailers, etc.
3. Raise any curbs to NRCA 8" height.
4. Contractor to insure proper cricket slope for water to properly flow to drain, ponding water is cause for rejection.
5. Contractor to install new clad metal thru wall scuppers.
6. Install clad metal rake flashing.
7. Mechanically attach ¼" primed DensDeck to parapet wall and valley,
8. Fully adhere KEE membrane in designated areas, up and over parapet wall, and under shingles.
9. Properly install all new metal coping cap system per manufactures details and guidelines.
10. Properly flash all penetrations, pipes, curbs, etc. per manufactures guidelines.
11. Contractor to install "owner provided material"
12. Manufacturers Rep to provide job site inspections.
13. Contractor to provide all permits.
14. Contractor to coordinate all work with the City of Placerville.

**1.3 SUBMITTALS**

- A. Product Data: Provide manufacturer's technical product data for each type of roofing product specified. Include data substantiating that materials comply with specified requirements.
  1. Membrane
  2. Fasteners
  3. Insulation

## **SINGLE-PLY ROOFING - SECTION 07542**

### **Page 2**

- B. Specimen Warranty: Provide an unexecuted copy of the warranty specified for this Project, identifying the terms and conditions required of the Manufacturer and the Owner.
- C. Design Loads: Submit copy of manufacturer's minimum design load calculations according to ASCE 7-05, In no case shall the design loads be taken to be less than those detailed in Design and Performance Criteria article of this specification.
- D. Certificates: Cool Roofing certified by Cool Roof Rating Council.
- E. Shop Drawings: For roofing system. Include plans, elevations, sections, details and attachments to other Work.
- F. Samples: If specifically requested for specified products; required for alternate products.
- G. Installer Qualifications: Provide evidence that installers meet the requirements of Article 1.4.
- H. Closeout Submittals:
  - 1. O & M Manuals: Maintenance instructions.
  - 2. Guarantee: Provide completed form per Article 1.5.
  - 3. Manufacturers weekly inspection reports noting issues, corrections, and final inspection photos.

### **1.4 QUALITY ASSURANCE**

- A. Installer Qualifications:
  - 1. Minimum of 5 years of experience on similar work; knowledge and understanding of standards referenced herein; skill necessary to perform in compliance with this specification. Installers failing to demonstrate the required experience, knowledge, or skill shall be removed from the project.
  - 2. Factory trained and approved applicator.
  - 3. Installer's Field Supervision: Maintain a full-time Supervisor/Foreman on job site during all phases of roofing work while roofing work is in progress. Maintain proper supervision of workmen.
  - 4. Source Limitations: Obtain all components of roof system from a single manufacturer. Secondary products that are required shall be recommended and approved in writing by the roofing system Manufacturer.
- B. Testing Characteristics: UL Class A roof; I-90 wind uplift.
- C. Applicator-Manufacturer Review: Provide Drawings and Specifications review by Applicator with agent of roofing manufacturer; obtain manufacturer's agreement that specified system is proper for application shown.
- D. Manufacturers Participation:
  - 1. Pre-Application Job-Site Conference: Arranged by Applicator, with a minimum of 1-week advance notice; for review of storage, handling, protection, surface preparation, materials and application specifications; attended by applicator, his foreman, Architect, inspector, and manufacturer's agent.
  - 2. Source Quality Control: Manufacturer shall have in place a documented, standardized quality control program such as ISO-9001.
  - 3. When the Project is in progress, the roofing system manufacturer will provide the following:

- a. Report progress and quality of the work as observed.
- b. Provide job site inspections a minimum of two (2) days a week throughout the course of construction.
- c. Provide electronic inspection reports submitted weekly to the Owner.
- d. Report to the Owner in writing any failure or refusal of the Contractor to correct unacceptable practices called to the Contractor's attention.
- e. Confirm after completion that manufacturer has observed no application procedures in conflict with the specifications other than those that may have been previously reported and corrected.

## **1.5 WARRANTY**

- A. Manufacturer: Provide 15 year "No Dollar Limit" warranty on manufacturers form. Warranty shall period shall begin on date of acceptance of roofing by Owner.
- B. Manufacturer will provide the following services at years 5, 10, & 15 at no cost to the owner.
  1. Inspection by a technical service representative and delivery of a written inspection report documenting roof conditions.
  2. General rooftop housekeeping recommendations, subject to limits but generally including removal of incidental debris.
- C. Provide one warranty by a single approved manufacturer for the roof areas, membrane roof areas, wall system, and transitions between the material types.
- D. Installer: Provide in required form for a period of two (2) years from date of acceptance by Owner.

## **PART 2 - PRODUCTS**

### **2.1 KEE SINGLE-PLY ROOFING**

- A. Acceptable Products:
  1. Basis of Design: Materials, manufacturer's product designations, and/or manufacturer's names specified herein shall be regarded as the minimum standard of quality required for work of this section.
  2. The design is based upon roofing systems by The Garland Company Inc./CI, Local representative Tim Samaniego (775) 772-9822
    - a. Solar Bright 60 KEE Membrane (ASTM D 751)
    - b. Membrane Thickness: (ASTM D 751) 60 mil nominal.
    - c. Tensile Strength (ASTM D 751): 515 lbf/in
    - d. Tearing Strength (ASTM D 751): 275 lbf/in
    - e. Elongation (ASTM D 2136): -40 degrees F
    - f. Factory Seam Strength (ASTM D 751) 90%
    - g. Solar Reflectivity (ASTM E 903) 81%
    - h. Emissivity (ASTM E 408) 95%
- B. Parapet Wall Covering: 0.060 inch thick.

## **SINGLE-PLY ROOFING - SECTION 07542**

Page 4

- C. Perimeter Sheets and Securement: Per FM 1-29.

### **2.2 UNDERLAYMENT**

- A. Slip Sheet: As recommended by manufacturer

### **2.3 NAILERS**

- A. Douglas Fir; No. 2 or better, pressure treated; no creosote or asphalt preservatives allowed.

### **2.4 ROOF BOARD INSULATION**

- A. Roof Insulation base layer: Hunter Panels or equal, (ASTM C 1289) polyisocyanurate rigid insulation board
  - 1. Thickness: N/A
  - 2. R-Factor: N/A
  - 3. Attachment Method: N/A
- B. Roof Insulation top layer: Primed DensDeck roof board 4' x 8'.
  - 1. Thickness: ¼" inch
  - 2. Attachment Method: Mechanically attached per manufacturers wind up lift calculations
- C. Tapered Insulation (as required and shown on drawings for crickets, etc.): Tapered Hunter Panels or equal insulation board to be used as required to construct tapered insulation system.
  - 1. Field Slope: Minimum ¼" inch per foot.
  - 2. Sump Slope: Minimum ½" inch per foot. Contractor is responsible for proper water drainage
  - 3. Cricket Slope: Minimum ½" inch per foot. Contractor is responsible for proper water drainage
  - 4. Attachment Method: Mechanically attached.
- D. Alternate Manufacturers: Proposed equals are subject to substitution process per Section 01630 – PRODUCT OPTIONS AND SUBSTITUTIONS.

### **2.5 FASTENERS**

- A. Heavy duty #15 threaded fastener with a #3 Phillips drive used with Piranha Fastening Plate to secure Mechanically Fastened Roofing Systems. It is used on minimum 22-gauge steel decks or minimum 15/32" CDX plywood decks. It is also designed to offer an optimum combination of driving performance, back-out and corrosion resistance with excellent pullout performance.
- B. Piranha Plate: A 2-3/8" diameter metal barbed fastening plate used with HP-X, CD-10 or HD 14-10 Fasteners for membrane or insulation securement. This plate can be used for membrane or insulation securement on Mechanically Fastened Roofing Systems.
- C. Insulation Fastening Plate: A nominal 3-inch metal plate used for insulation attachment in conjunction with the appropriate fastener.
- D. Nails: SFS 2-1/4-inch-long wood deck fastener with domed convex stress plate, or Trocal No. 14 1-5/8-inch-long fastener with 2-inch round metal barbed stress plate.

## **2.6 ACCESSORIES**

- A. SolarBright Plus 60 membrane shall be used for all flashing requirements to match the field membrane and warranty expectations selected for the roofing system.
- B. SolarBright Inside Corners: Pre-molded corner flashing for inside corners. 60 mil thickness. Color - White.
- C. SolarBright Outside Corners: Pre-molded corner flashing for outside corners. 60 mil thickness. Color - White.
- D. SolarBright T-Joint Covers: 40 mil thick non-reinforced PVC flashing cut into a 4.5-inch (114mm) diameter circle used to seal step-offs at splice intersections.
- E. SolarBright Pipe Flashings: A pre-molded flashing and clamping ring used for pipe penetrations. Available for 1 inch to 6-inch (25 - 152mm) diameter pipes.
- F. SolarBright Split Pipe Seals: Pre-fabricated flashing consisting of 60 mil thick reinforced Membrane for pipes 1 inch to 6 inches (25 - 152mm) in diameter. A split (cut) and overlap tab are incorporated to allow the pipe seal to be opened and wrapped around the pipe when it is not possible to pull a standard pipe flashing over a round penetration.
- G. SolarBright Non-Reinforced Flashing: 60 mil thick rolls 12 inches and 24 inches wide. Used for inside/outside corners and field fabricated pipe flashings when use of pre-molded accessories is not feasible.
- H. SolarBright Heat Weldable Walkway Rolls: offering superior tear, puncture and weather resistance and designed to protect membrane in those areas exposed to repetitive foot traffic or other hazards. Walkway material may be heat welded to membrane using an automated heat welder or hand-held heat welder. Walkway Rolls are 36 inches (914mm) wide by 60 feet (18.3 M) long and are nominal 80 mils thick.
- I. Single ply Coated Sheet Metal: Provide where flashing, gravel stops and sheet metal are in contact with Single -ply roofing membrane.

## **2.7 SOLVENT, SEALANT, AND ADHESIVES**

- A. As recommended by manufacturer.
- B. SolarBright Bonding Adhesive: Solvent-based contact adhesive that allows bonding of membrane to various porous and non-porous substrates.
  - 1. Base: Synthetic Rubber.
  - 2. Color: Pale Yellow.
  - 3. Solids: 24.2 percent.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

## **SINGLE-PLY ROOFING - SECTION 07542**

Page 6

- C. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- D. Do not commence Work until all other work trades have completed jobs that require them to traverse the deck on foot or with equipment.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 PREPARATION**

- A. Do not apply wet roofing, on wet application surface, or when temperature of deck less than 50 degrees F.
- B. Provide entire roof system including treated wood nailers, Single-ply coated sheet metal, and coordination of items such as roof drains, sumps, jacks, etc., as specified in Section 07601 - FLASHING AND SHEET METAL.
- C. Protect adjoining materials from stains particularly around perimeter of building; prevent debris from clogging roof drains.
- D. Deck surface swept clean and dry; keep free of loose and foreign materials.

### **3.3 INSTALLATION**

- A. Install in conformance with referenced standards, manufacturer's written directions, as shown, and as specified.
  - 1. Install insulation or membrane underlayment over the substrate with boards butted tightly together with no joints or gaps greater than 1/4 inch (6 mm). Stagger joints both horizontally and vertically if multiple layers are provided.
  - 2. Secure insulation to the substrate with the required mechanical fasteners or insulation adhesive in accordance with the manufacturer's current application guidelines.
  - 3. Securely attach insulation to the roof deck for Adhered or Mechanically Fastened Roofing Systems. Attachment must have been successfully tested to meet or exceed the calculated uplift pressure required by the International Building Code (ASCE-7) or ANSI/SPRI WD-1.
- B. Application:
  - 1. It will be the responsibility of the roofing contractor to initiate and maintain a QC program to govern all aspects of the installation of the SolarBright KEE Roofing System.
  - 2. The project foreman and or supervisor will be responsible for the daily execution of the QC program which will include but is not limited to the supervision, inspection and probing of all heat welding incorporated within the SolarBright KEE Roofing System.
  - 3. If inconsistencies in the quality of the application of the composite, membrane and/or welds are found, all work shall cease until corrective actions are taken to ensure the continuity the installation.
  - 4. Unroll and position membrane without stretching. Provide and secure both perimeter and field membrane sheets in accordance with the manufacturer's most current specifications and details.
  - 5. Secure the membrane with the required fasteners and plates centered over the pre-printed marks approximately 1 1/2 inches (39mm) from the edge of the membrane sheet.
  - 6. Install adjoining membrane sheets in the same manner in accordance with the manufacturer's current application requirements.
  - 7. Attachment Schedule:
    - 1. Field (Zone 1) Fastener Density: See manufacturers wind up lift calcs

2. Perimeter (Zones 2 and 3) Fastener Density: See manufacture calcs
  3. Perimeter (Half-width) Sheets: 2
- 
8. Parapet Wall Covering: Install as shown, extend to full height of parapet; lap under parapet cap flashing and over wall substrate 2 inches minimum on the back side of the wall. Secure in place 9" on center on the outside face to assure a completely watertight installation.
  9. Walkway: Per manufacturer's instructions and as shown on drawings. If drawings do not show walkways a minimum of the service side of all HVAC units will have walkway installed.
- C. Fasteners:
1. General: Per manufacturer's recommendation; fastening length and pattern based on performance values supplied by the fastener/disc manufacturer and conforming to UL fastening pattern.
  2. Walkway Fastening: Provide 2-inch continuous heat weld strip around perimeter of membrane.
- D. Hot Air Welding
1. All field seams exceeding 10 feet in length shall be welded with an approved automatic welder.
  2. All field seams must be clean and dry prior to initiating any field welding.
  3. Remove foreign materials from the seams (dirt, oils, etc.) with Acetone or authorized alternative. Use CLEAN WHITE COTTON cloths and allow approximately five minutes for solvents to dissipate before initiating the automatic welder. **Do not use denim or synthetic rags for cleaning.**
  4. All welding shall be performed only by qualified personnel to ensure the quality and continuity of the weld.
  5. Contaminated areas within a seam will inhibit proper welding and will require a membrane patch
- E. Hand Welding
1. The lap or seam area of the membrane should be intermittently tack welded to hold the membrane in place.
  2. The back "interior" edge of the membrane shall be welded first, with a thin, continuous weld to concentrate heat along the exterior edge of the lap during the final welding pass.
  3. The nozzle of the hand-held hot air welder shall be inserted into the lap at a 45° angle to the lap. Once the polymer on the material begins to flow, a hand roller shall be use to apply pressure at a right angle to the tip of the hand welder. Properly welded seams shall utilize a 1-1/2-inch-wide nozzle, to create a homogeneous weld, a minimum of 1-1/2 inches in width.
  4. Smaller nozzles may be used for corners, and other field detailing, maintaining a minimum 1 inch weld.
- F. Automatic Machine Welding
1. Follow all manufacturers' instructions for the safe operation of the automatic welder.
  2. Follow local code requirements for electric supply, grounding and surge protection.

## SINGLE-PLY ROOFING - SECTION 07542

Page 8

3. The use of a dedicated, portable generator is highly recommended to ensure a consistent electrical supply, without fluctuations that can interfere with weld consistency.
4. Properly welded seams shall utilize a 1-1/2-inch-wide nozzle, to create a homogeneous weld, a minimum of 1-1/2 inches in width.

### G. Inspection

1. The job foreman and/or supervisor shall initiate daily inspections of all completed work which shall include, but is not limited to the probing of all field welding with a dull pointed instrument to assure the quality of the application and ensure that any equipment or operator deficiencies are immediately resolved.
2. Ensure that all aspects of the installation (sheet layout, attachment, welding, flashing details, etc.) are in strict accordance with the most current WeldTite Roofing Systems Specifications and Details.
3. Excessive patching of field seams because of inexperienced or poor workmanship will not be accepted at time of FINAL INSPECTION FOR WARRANTY ACCEPTANCE.

### H. Metal Flashings:

1. General: Fabricate and install per Section 07601 - FLASHING AND SHEET METAL, as shown and per manufacturer's recommendations. Install PVC coated metal flashing at intersections of roofs with sloped or vertical surfaces, roof interruptions and penetrations.
2. Base Flashing: Extend up vertical surfaces 6 inches, minimum, and onto the horizontal roof surfaces not less than 3 inches, unless otherwise noted. Provide KEE coated metal flashing with 2 inches minimum overlap of roofing membrane; heat weld in the horizontal plane, with subsequent sealing of seams with sealant.
3. All perimeter edge details are to be fabricated from SolarBright KEE Clad Metal.
4. Ensure all fascia extend a minimum of 2 inch lower than the bottom of the wood nailers.
5. Fasten all metal flashing to wood nailers or approved substrate with approved fasteners 8 inches on center.
6. Break and install SolarBright Clad metal in accordance with approved details, ensuring proper attachment, maintaining 1/2-inch expansion joints and the installation of a minimum 2-inch bond breaker tape prior to sealing the joint.
7. Solidly weld SolarBright Clad expansion joints with a 6-inch strip of SolarBright membrane welded to the SolarBright Clad, covering the bond breaker tape (cover plates are optional).

### I. Roof Drains

1. Flash all roof drains in accordance with SolarBright roof drain details.
2. Replace all *worn or broken* parts that may cut the SolarBright membrane or prevent a watertight seal. This includes the clamping ring and strainer basket.
3. Replace all drain bolts or clamps used to hold the drain compression ring to the drain bowl.
4. SolarBright non-reinforced 60 mil membrane shall be used for flashing the drain assembly. Drain assemblies and basins or "sumps" must be free of any asphalt or coal tar pitch residue prior to installation.
5. The drain target sheet should be sized and installed to provide for a minimum of 12 inch of exposed 60 mil on all sides of the drain.



**3.4 FIELD QUALITY CONTROL**

- A. Perform field inspection and testing as required under provisions of Division 01 Section Quality Requirements & manufacturers recommendations.
- B. Heat weld test cuts will be required. One (1) test cut per 5,000 square feet will be required.
- C. Correct defects or irregularities discovered during field inspection.
- D. Require attendance of roofing materials manufacturers' representatives at site during installation of the roofing system a minimum of two (2) days per week. A copy of the specification should also be on site at all times.

**3.5 CLEANING**

- A. Keep premises free from accumulation of waste and debris. At completion of installation remove surplus materials and debris.
- B. At completion clean exposed surfaces in a manner that will not damage finish.

**3.6 FINAL INSPECTION**

- A. At completion of roofing installation and associated work, meet with Contractor, Architect, installer, installer of associated work, Owner, roofing system manufacturer's representative, and other representatives directly concerned with performance of roofing system.
- B. Walk roof surface areas of the building, inspect perimeter building edges as well as flashing of roof penetrations, walls, curbs and other equipment. List all items requiring correction or completion and furnish copy of list to each party in attendance.
- C. The roofing system manufacturer reserves the right to request a thermographic scan of the roof during final inspection to determine if any damp or wet materials have been installed. The thermographic scan shall be provided by the Roofing Contractor.
- D. If core cuts verify the presence of damp or wet materials, the Roofing Contractor shall be required to replace the damaged areas at his own expense.
- E. Repair or replace deteriorated or defective work found at time above inspection as required to produce an installation which is free of damage and deterioration at time of Substantial Completion and according to warranty requirements. Notify the Contractor, Architect, & Owner upon completion of corrections.
- F. Following the final inspection, provide written notice of acceptance of the installation from the roofing system manufacturer.

END SECTION 07542