

**Summit County Environmental Services  
Fishcreek WWTP Replacement Project**

PART 1 GENERAL

1.1 DESCRIPTION

- A. The Summit County Environmental Services roof replacements consist of the Administration Building and the Filter Building at the Fishcreek WWTP in Summit County.
- B. The bases of design: Installing Carlisle Sure-Seal (black) Fully Adhered Roofing System as outlined below:  
Apply the Fully Adhered EPDM Roofing System in conjunction with polyisocyanurate rigid insulation over the existing deck after removing all existing built-up roofing.

1.2 EXTENT OF WORK

- A. Provide all labor, material, tools, equipment, and supervision necessary to complete the installation of a Carlisle Sure-Seal™ 60-mil thick reinforced EPDM membrane Fully Adhered Roofing System. Work includes new flashings, flat stock and tapered insulation as specified herein. Roof system shall be installed in strict accordance with the manufacturer's most current **20-year system specifications** and details.
- B. The roofing contractor shall be fully knowledgeable of all requirements of the project specifications, contract documents, design criteria, roofing manufacturer's details and specification for system and warranty specified. Contractor shall also have full knowledge of all job site dimensions, existing roof thicknesses, conditions and restrictions that will affect their work schedule and performance for proper project closeout.
- C. Scope of Work – Roof replacement includes but not limited to:
1. Properly remove the existing roof membrane, flashings, metal flashings, insulation in their entirety down to roof decking or wall substrates.
  2. Contractor is responsible for all the removal, hauling and approved dump site records for all project demolition, debris and other project site cleanup.
  3. Prepare curbs walls to receive new EPDM wall flashings, new metal counterflashings as needed. Where possible extend membrane up and over curb wall. Raise curbs were required to have an 8-inch minimum flashing height above finished roof.
  4. Remove existing fascia and gravel stop. Install new wood blocking to match height of new tapered insulation at its highest point. Install new edge and metal fascia.
  5. Unless otherwise indicated install 1-inch minimum thickness flat stock insulation with a minimum thickness 1/2-inch start of tapered insulation at drains. Adhered bottom layer of insulation to concrete decking at a maximum spacing of 4-inches o.c. Install tapered insulation, crickets and saddles with approved adhesive.
  6. Install RUSS strips or mechanically fastened securement strips at perimeters.
  7. Install fully adhered 60-mil non-reinforced EPDM membrane system and flashings.
  8. Remove and replace with new, all roof drain clamping rings and bolts.

9. Install curb flashings with slip mounted counterflashings as needed.
10. Install new pourable sealer pockets, prefabricated pipe boots and field fabricated pipe seals at all existing penetrations as needed.
11. Supply all miscellaneous labor and material to complete this project meeting **20 year system specifications** in a respectable good workmanship like manor. Provide building owner with a **non-prorated 20-year Total System Warranty** as per the warranty section in these documents.
12. Refer to bid form for project alternates and replacement unit pricing.

## 1.2 REFERENCES

- A. American Society of Civil Engineers (ASCE) - ASCE 7 - Minimum Design Loads for Buildings and Other Structures, Current Revision.
- B. ANSI/SPRI WD-1 "Wind Design Standard for Roofing Assemblies".
- C. ANSI/SPRI ES-1 - Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems.
- D. ANSI/SPRI/FM 4435/ES-1 - Wind Design Standard for Edge Systems Used with Low Slope Roofing System.
- E. ASTM International (ASTM):
  - ASTM C 1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.
  - ASTM D 412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.
  - ASTM D 624 - Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers.
  - ASTM D 816 - Standard Test Methods for Rubber Cements.
  - ASTM D 4263 - Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method.
  - ASTM D 4637 - Standard Specification for EPDM Sheet Used In Single-Ply Roof Membrane.
  - ASTM E 96 - Standard Test Methods for Water Vapor Transmission of Materials.
- F. Factory Mutual (FM Global):
  1. Approval Guide.  
Factory Mutual Standard 4470 - Approval Standard for Class 1 Roof Covers.  
Loss Prevention Data Sheets 1-28, 1-29 and 1-49.
- G. International Code Council (ICC):
  1. International Building Code (IBC).
- H. National Roofing Contractors Association (NRCA) - Low Slope Roofing and Waterproofing Manual, Current Edition.
- I. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) - Architectural Sheet Metal Manual.
- J. Underwriters Laboratories (UL):
  1. TGFU R1306 - "Roofing Systems and Materials Guide".
  2. UL-790 - Standard Test Method for Fire Tests of Roof Coverings.
- K. ANSI/ASHRAE/IESNA Standard 90.1 (2007): Energy Standard for Buildings Except Low-Rise Residential Buildings

### 1.3 DESIGN CRITERIA

- A. Wind Uplift Performance:
  - 1. The specified roofing assembly must have been successfully tested by a qualified testing agency following ANSI/FM 4474 to resist the design uplift pressures calculated according to:
  - 2. American Society of Civil Engineers (ASCE 7)
  - 3. International Building Code (IBC)
  - 4. ANSI/SPRI WD-1 2012 "Wind Design Standard Practice for Roofing Assemblies", assembly uplift shall be not less than 90-lbs/sf in the field of roof with perimeter and corner enhancements.
  - 5. Roof system to meet manufacturer's requirements to include the following extended wind speed coverage in the total roof system warranty: maximum 3 second wind speeds gusts of 72 MPH measured 33 feet above ground in a non-prorated total system warrant.
  
- A. Fire Resistance Performance:
  - 1. Roof system will achieve a UL Class A rating when tested in accordance with UL-790.
  
- B. Drainage: Provide a roof system with positive drainage where all standing water dissipates within 48 hours after precipitation ends.
  
- C. Building Codes:
  - 1. Roof system will meet the requirements of all federal, state and local code bodies having jurisdiction.

### 1.4 SUBMITTALS

- A. Contract must submit written approval from Carlisle verifying the contractor's qualifications, system design and warranty approval as specified.
  
- B. Additional submittals as required by building owner's representative or design professional.
  
- C. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.
  
- D. Detail Drawings:
  - 1. Submit approved plan, section, elevation or isometric drawings which detail the appropriate methods for all flashing conditions found on the project.
  - 2. Coordinate approved drawings with locations found on the Contract Drawings.
  
- E. Selection Samples: For each finish product specified, two complete sets of chips representing manufacturer's full range of available colors, membranes, and thicknesses.
  
- F. Verification Samples: For each finish product specified, two samples, minimum size 4 inches (100 mm) square representing actual product, color, and patterns.

### 1.5 CONTRACTOR QUALIFICATIONS

- A. Installer may be required to submit confidential financial statement, experience questionnaire, financial resources and liabilities.
  
- B. Bidders must submit names of any subcontractors to be utilized on this project.

## 1.6 BID PROCESS AND REQUIREMENTS

- A. The Prime Bidder on this project must be a Roofing Contractor with experience and qualifications specified in the Construction Documents.
- B. Bidder must list any partners or subcontractors (e.g. Demolition, Plumbers, Masons, Electrical).
- C. Requests for substitutions from manufacturers, suppliers or subcontractors will not be considered.
- D. The building owner reserves the right to modify the proposal to within 24 hours of the scheduled date for the opening of proposals. All addenda shall be in writing and sent to all bidders having attended the pre bid conference.
- E. The Bidder shall apply for and secure all incidental permits, governmental fees and licenses necessary for proper execution and completion of the Work.

## 1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: All products specified in this section will be supplied by a single manufacturer with a minimum of twenty (20) years of experience.
- B. Manufacturer Qualifications: Inspector shall be employed and trained by the manufacturer and have received product-specific training from the manufacturer of products.
- C. Installer Qualifications:
  - 1. All products listed in this section are to be installed by a single installer with a minimum of five (5) years demonstrated experience in installing products of the same type and scope as specified.
  - 2. Installer must be capable of extending the Manufacturer's Labor and Materials guarantee.
  - 3. Installer must be capable of extending the Manufacturer's No Dollar Limit guarantee.
- D. Pre-construction Meeting: No work shall proceed until a pre-construction meeting is held to review any and all details and question regarding this project. In attendance shall be the following:
  - 1. Individual designated by building owner's representatives.
  - 2. Contractors project manager, superintendant or foremen.
  - 3. Roofing manufacturer's representative with technical background or designated quality assurance roof observer.
- E. Contractor shall provide no less than three emergency contact names and phone numbers to be available days, nights and weekends for any emergency that may arise during this project.

## 1.8 SAFETY

- A. The roofing contractor shall be responsible for all means and methods as they relate to safety and shall comply with all applicable local, state and federal requirements that are safety related. Safety shall be the responsibility of the roofing contractor. All related personnel shall be instructed daily to be mindful of the full time requirement to maintain a safe environment for the facility's occupants including staff, visitors, customers and the occurrence of the general public on or near the site.
  - 1. All application, material handling, and associated equipment shall conform to

- and be operated in conformance with OSHA safety requirements.
- 2. Comply with applicable Federal, State, Local and Owner health and safety requirements.
- 3. Applicable asbestos-containing material removal procedures must be used.
- 4. Notify the Owner in advance whenever work is expected to be potentially hazardous and/or harmful to persons and/or property on the site. Contractor is solely responsible for employing means and methods (acceptable to the Owner) deemed necessary to prevent harm to such persons and property.
- 5. Maintain a construction crewmember as a Floor Area Guard whenever roof decking is being repaired or replaced.
- 6. Maintain proper fire extinguishing equipment and trained personnel within close proximity and with unobstructed access to work areas whenever power tools, torches and/or other heat-producing equipment is being used on the project.

#### 1.9 NOTICES AND POSTINGS

- A. The Contractor shall give all notices and comply with all laws, ordinances, rules, regulations and orders of any public authority bearing on the performance of the Work. If Contractor performs any Work knowing it to be contrary to such laws, ordinances, rules and regulations, without providing notice to building owner's representative, Contractor shall assume full responsibility and shall bear all costs.
- B. All permits shall be placed in a plastic tube and be kept in the location designated by the Fire Safety Officer for the entire duration of the work the following:
  - 1. Copies of all permits
  - 2. Copies of all MSDS sheets
  - 3. A Job Board showing escape routes and the locations of fire alarms and smoke detectors and other information and documents as required by the fire safety officer.
  - 4. A completed safety triangle listing hazardous substance ratings of products stored at or in use at the job site

#### 1.10 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store and dispose of hazardous materials, and materials contaminated by hazardous materials, in accordance with requirements of local authorities having jurisdiction.
- C. Insulation and roofing membrane must be stored in a well-drained area on pallets, a minimum of 4-inches off the floor, roof or ground, and tightly covered with waterproof breathable tarps.
- D. When loading materials onto the roof, the roofing contractor must comply with the requirements of the building owner to prevent overloading and possible disturbance to the building structure.

#### 1.11 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
- B. Refer to Carlisle's Roofing System specification, Part II - Application, for General

Job Site Considerations.

- C. Material Safety Data Sheets (MSDS) must be on location at all times during the transportation, storage and application of materials.
- D. When positioning membrane sheets, exercise care to locate all field splices away from low spots and out of drain sumps. All field splices should be shingled to prevent bucking of water.
- E. Proceed with roofing work only when weather conditions are in compliance with the manufacturer's recommended limitations, and when conditions will permit the work to proceed in accordance with the manufacturer's requirements and recommendations.
- F. Provide adequate number of experienced workmen regularly engaged in this type of work who are skilled in the application techniques of the materials specified. Provide at least one thoroughly trained and an experienced superintendent on the job at all times roofing work is in progress.
- G. Roofing, flashings, and insulation shall be installed and sealed in a watertight manner on same day of installation or before arrival of inclement weather.
- H. Contractor will have to carefully coordinate his work to keep building watertight at all times.
- I. Install drain clamping rings daily prior to workers leaving the site.
- J. There shall be no deviations made from this specification. Any deviation from the manufacturer's installation procedures must be supported by written certification on manufacturer's letterhead and presented for the building owner and specifier's consideration.
- K. Proceed with work so new roofing materials are not subject to construction traffic. When necessary, new roof sections shall be protected and inspected upon completion for possible damage.
- L. Provide protection, such as 3/4 inch thick plywood, for all roof areas exposed to traffic during construction. Plywood must be smooth and free of fasteners and splinters.
- M. The surface on which the insulation or roofing membrane is to be applied shall be clean, smooth, dry, and free of projections or contaminants that would prevent proper application of or be incompatible with the new installation, such as fins, sharp edges, foreign materials, oil and grease.
- N. New roofing shall be complete and weather tight at the end of each work day.
- O. Contaminants such as grease, fats and oils shall not be allowed to come in direct contact with the roofing membrane.

#### 1.12 WARRANTY

- A. On Fully Adhered areas with 90-mill reinforced EPDM membrane systems: At project closeout, provide to Owner or Owners Representative an executed copy of the manufacturer's non-prorated or **No Dollar Limit 20-year Total System Warranty**, outlining its terms, conditions, and exclusions from coverage. Single source warranty shall include supplied roofing membrane, base flashings, roofing insulation, accessories, roof edge metal, and termination bar, other components of membrane roofing system.
  - 1. Warranty to cover standard maximum wind gust speeds of no less than 72

MPH.

2. Warranty shall also cover leaks caused by accidental punctures with up to 16 man-hours per year.
  3. Pro-rated System Warranties shall not be accepted.
  4. Any legal action during the execution of the warranty period between the owner and the roofing system manufacturer shall be settled in Summit County, in the State of Ohio. Any language in the manufacturer's warranty that limits the owner's rights will not be acceptable and the bid shall be rejected.
  5. Any legal action during the execution of the warranty period between the owner and the roofing system manufacturer shall be settled in Cuyahoga County, in the State of Ohio. Any language in the manufacturer's warranty that limits the owner's rights will not be acceptable and the bid shall be rejected.
- B. Special Project Warranty: Submit roofing Installer's warranty, signed by Installer, covering Work of this Section, including all components of membrane roofing system such as roofing membrane, base flashing, roof insulation, fasteners, roof walkway products, painting, wood blocking, curb mountings, metal flashings, and edge metal for the following warranty period:
1. Warranty Period: 2-years from date of Substantial Completion.



## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Acceptable Manufacturers: Carlisle SynTec, Firestone and Versico.
- B. Single Source: Manufacturers of membrane product shall also manufacture all polymeric components for the roofing system, including, but not limited to, membrane, insulation, adhesives, primers, flashings, caulks and tapes."
- C. Membrane must be manufactured by a domestic supplier with a minimum ten-year history of EPDM manufacturing in a production facility located in the United States."

### 2.2 SCOPE / APPLICATION

- A. Roof System: Provide a waterproof roof system, capable of withstanding uplift forces as specified in Design Criteria.
  1. Membrane Attachment: Fully Adhered.
- B. Base Flashing: Provide a waterproof, fully adhered base flashing system at all penetrations, plane transitions and terminations.
- C. Insulation: Provide a roof insulation system beneath the finish membrane.

### 2.3 INSULATION

- A. SecurShield Polyiso: Rigid board with coated glass fiber mat facers on both sides, meeting or exceeding the requirements of ASTM C 1289.
  1. Compressive Strength: 20 psi (138 kPa).

2. Density: 2 lb per cubic foot (24 kg/cu m) minimum.

## 2.4 INSULATION ADHESIVE AND PRIMERS

- A. Sure-Seal FAST 100 Adhesive: A spray or extruded applied, two-component polyurethane, low-rise expanding foam adhesive used for attaching approved insulations to compatible substrates (concrete, cellular lightweight insulating concrete, gypsum, cementitious wood fiber, wood or steel) or existing smooth or gravel surfaced BUR, modified bitumen or cap sheets.
- B. Sure-Seal FAST Catalyst: Added to FAST Adhesive (Part B Side) to quicken adhesive reaction time.
- C. Sure-Seal FAST Dual Cartridge Adhesive: A two-component, polyurethane construction grade, low-rise expanding adhesive designed for bonding insulation to various substrates using a portable applicator.
- D. FAST Box Set: A two-component, polyurethane construction grade, low-rise expanding adhesive designed for bonding insulation to various substrates using a portable applicator.
- E. FAST Bag in a Box: A two-component, polyurethane construction grade, low-rise expanding adhesive designed for bonding insulation to various substrates, packaged for use with the PaceCart 2.
- F. Cav-Grip: s a multi-purpose contact adhesive recommended for enhancing bond of CCW self-adhering sheet products and for bonding 725TR Air & Vapor Barrier and board insulation to various substrates.

## 2.5 ADHERED AREAS - ETHYLENE, PROPYLENE, DIENE TERPOLYMER (EPDM) MEMBRANE

- A. Sure-Seal Non-Reinforced Membrane: Cured, non-reinforced EPDM membrane meeting the requirements of ASTM D 4637 Type I.
  1. Color: Black.
  2. Membrane Thickness: 90 mil nominal.
  3. Sheet Dimensions:
    - a. Width: 10 feet (3.05 m) maximum.
    - b. Length: 100 feet (30.5 m) maximum.
  4. Performance:
    - a. Tensile Strength: 1550 psi (10.7 MPa) minimum.
    - b. Tear Resistance: 200 lbf/in (35 kN/m) minimum.
    - c. Elongation: 480 percent.

## 2.6 RELATED MATERIALS AND ACCESSORIES

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with Black EPDM membrane roofing. All roofing materials shall be manufactured and supplied by single source and covered by non-prorated total system warranty.
- B. Miscellaneous Accessories: Provide adhesives, lap sealant, water cutoff mastic, metal termination bars, pourable sealers, preformed cone and sheet flashings, preformed inside and outside corner sheet flashings, seam sealants, termination reglets, cover strips, sealer pockets manufacturer's fasteners, and other system accessories.



- C. Sure-Seal Pressure-Sensitive "T" Joint Covers: A factory cut uncured 60-mil thick EPDM flashing laminated to a nominal 35-mil Factory-Applied TAPE, used to overlay field splice intersections and to cover field splices at angle changes.
- D. Carlisle Weathered Membrane Cleaner: Clear, solvent-based cleaner used to loosen and remove contaminants from the surface of exposed EPDM membrane prior to applying EPDM Primer.
- G. Seaming Material: Manufacturer's standard synthetic-rubber polymer primer and 6-inch wide minimum, butyl splice tape with release film when factory applied is not available.
- H. Carlisle Weathered Membrane Cleaner: Clear, solvent-based cleaner used to loosen and remove contaminants from the surface of exposed EPDM membrane prior to applying EPDM Primer.
- I. 90-8-30A Bonding Adhesive: A high-strength, yellow colored, synthetic rubber adhesive used for bonding Sure-Seal/Sure-White EPDM membranes to various surfaces.
- J. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening membrane to substrate, and acceptable to membrane roofing system manufacturer.

## 2.7 EDGE METAL, SCUPPERS AND TERMINATIONS

- A. All edge metal, copings and terminations shall meet all federal, state and local code bodies having jurisdiction.
- B. When shop fabricated, fabricate to specifications and profiles below or match existing edge metal and copings. Fabrication and installation shall meet SMACNA specifications, ES-1 certified and installed according to ANSI/SPRI/FM 4435/ES-1. Metal coping caps shall slope to inside of wall.
- C. Fasteners: Shall be screw type with a minimum pull-out resistance of 240 # (109 kg) as supplied by the manufacturer per substrate application. Fasteners shall be electrolytically compatible.
- D. SecurEdge 2000: A metal anchor bar fascia system consisting of a 20 gauge steel retainer bar, corrosion resistant fasteners and aluminum snap-on fascia cover.
  - 1. Type:
    - a. Fully Adhered, Mechanically Attached Version.
  - 2. Fascia Metal:
    - a. .040 inch aluminum.
    - b. Finish: Mil finish aluminum
  - 3. Accessories:
    - a. Corners, end caps, concealed splice joints, scuppers, etc. shall be fabricated by the edge metal manufacturer.
  - 4. Performance:
    - a. Tested per ANSI/SPRI ES-1 Standard to comply with the International Building Code and ANSI/SPRI/FM 4435/ES-1 - Wind Design Standard for Edge Systems Used with Low Slope Roofing System.
    - b. Cleat Fastener: Minimum #9 x 1 ½" stainless steel with neoprene washer.
- E. Exposed fasteners: High dome type stainless steel self-drilling screws with neoprene washers. Minimum size of #12 x 1", use sufficient size and length as required by coping manufacturer, SMACNA specifications, ES-1 and ANSI/SPRI/FM 4435/ES-1.

- F. Carlisle Sure-Seal Termination Bar: 1 inch (13 mm) wide, .098 inch (2.5mm) thick extruded aluminum bar pre-punched 6 inches (152 mm) on center with sealant ledge to support Lap Sealant.
  - 1. Fasteners:
    - a. HP Term Bar Nail-In: A 1 1/4 inch (32mm) long expansion anchor with threaded drive pin used for fastening Sure-Seal Termination Bar or Seam Fastening Plates to concrete, brick or block walls.

## 2.8 SCUPPERS

- A. Scuppers & Conductor Heads: W.P. Hickman Scuppers & Conductor Heads fabricated of .050 Kynar painted aluminum with welded seams and corners. Metal color shall be as designated by the Owner's Representative. System shall include factory formed miters, end caps and expansion joints per manufacturer's specifications and project conditions. Kynar painted scuppers, conductor heads, downspouts, and accessories color to match existing metal coping and approved by Building Owner's Representative from standard color chart. Other accessories shall include:
  - 1. Scupper Box: Scupper box to match existing opening width, height and thickness of wall.
  - 2. Conductor Head: Fabricate conductor heads to match existing, but not less than 10 inches wide by 8 inches deep by 8 inches from front to back.
  - 3. Downspouts: Downspouts shall be .040 Kynar painted aluminum with a minimum profile dimension of 3-inch by 5-inch in a maximum of 10-foot long sections. Sections fastened together per manufacturer's specifications.
  - 4. Downspout Wall Brackets: Install Kynar painted wall brackets supplied by manufacturer, minimum of 3 per 10-foot section.

## 2.9 ROOF SPECIALTIES AND ACCESSORIES

- A. Drain Inserts:
  - 1. Insert Drains consist of an 18" square aluminum flange with a 9" long drain stem in a depressed sump area for easy attachment to the deck and drainage system. Insert Drains include a 14" diameter strainer dome, stainless steel studs and nuts, and a high quality urethane seal to prevent possible water backflow. Properly size for maximum water flow.
- B. Lumber:
  - 1. Install new wood blocking as needed to complete this project meeting NRCA and SMACNA recommendations, specifications and details.
  - 2. New wood blocking to be installed and attached per local building codes and ANSI/SPRI/FM 4435/ES-1. Refer to Carlisle's DR-08-11 "Wood Nailers and Securement Criteria" (Factory Mutual Loss Prevention Data Sheet 1-19).
  - 3. Wood nailers that are anchored to steel, wood or masonry decking should not be less than 2" X 6" nominal (minimum 1-1/2" X 5-1/2").
  - 4. Wood nailers should be Douglas Fir, Southern Yellow Pine or of wood having similar decay resistant properties.
- C. Sheet Metal Counter Flashing:
  - 1. Fabricate and install new .032 mil finished aluminum counter flashings at equipment curbs as needed to complete this project meeting Carlisle, NRCA and SMACNA recommendations, specifications and details.



## 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.
- C. **Contractor is responsible for completing all roof system installation details as required to obtain total roof system warranty as specified.**

### 3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove and replace damaged or wet insulation to match existing.
- 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.

### 3.3 INSULATION - SYSTEM DESIGN

- A. Base Layer:
  - 1. Type: SecurShield Polyiso.
  - 2. Thickness: 1-inches.
  - 3. Attachment Method: Adhered to concrete
- B. Tapered System:
  - 1. Type: SecurShield Polyiso.
  - 2. Start Thickness: ½-inch.
  - 3. Field Slope: 1/4-inch per foot.
  - 4. Cricket and Saddles Slope: 1/2 - inch per foot.
  - 5. Attachment Method: Adhered.

### 3.4 INSULATION PLACEMENT

- A. Install insulation or membrane underlayment in multiple layers 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.
- B. Secure insulation to the substrate with the required mechanical fasteners or insulation adhesive in accordance with the manufacturer's current application guidelines.
- C. Do not install wet, damaged or warped insulation boards.
- D. Stagger joints in one direction unless joints are to be taped. Install insulation boards snug. Gaps between board joints shall not exceed 1/4 inch (6 mm). Fill all gaps in

excess of 1/4 inch (6 mm) with same insulation material.

- E. Wood nailers must be at least 3 1/2 inches (89 mm) wide or 1 inch (25 mm) wider than adjacent metal flange. Thickness must equal that of insulation but not less than 1 inch (25 mm) thickness.
- F. Miter and fill the edges of the insulation boards at ridges, valleys and other changes in plane to prevent open joints or irregular surfaces. Avoid breaking or crushing of the insulation at the corners.
- G. All insulation board shall lay flat and true to the roof deck or previous installed layer of insulation with proper adhesion. No curling or cupping permitted.
- H. Do not install any more insulation than will be completely waterproofed each day.

### 3.5 INSULATION ATTACHMENT

- A. Securely attach insulation to the roof deck for Adhered 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.
- C. Enhance the perimeter and corner areas in accordance with the International Building Code (ASCE-7) or ANSI/SPRI WD-1. **Project specific perimeter and corner enhancements: Install all tapered and flat stock insulation with a bead application of Fast adhesive with bead spacing of a maximum of 4" o.c. at perimeters and corners, minimum 8' wide. Refer to part E below.**
- D. Base layer of insulation adhered field of roof to substrate shall be bead / extruded at 4-inch on center maximum using a 1/2" to 3/4"-inch bead wet over the entire deck surface. Subsequent layers of insulation may be adhered with full spray coverage or bead / extruded at 6-inch on center maximum in the field.
- E. Install insulation layers, maximum 4 feet by 4 feet (1220 mm by 1220 mm), applied with adhesive, coverage rate as necessary to achieve the specified attachment and uplift rating. Apply adhesive bead so that the distance from the edge of the board does not exceed half the bead spacing (i.e. within 3" of bead spacing of 6" O.C.) Refer to Carlisle Detail A-27G. Press each board firmly into place after adhesive develops strings when touched, typically 1-1/2 to 2 minutes after adhesive was applied, and roll with a weighted roller. Add temporary weight and use relief cuts to ensure boards are well adhered. Stagger the joints of additional layers by a minimum of 6 inches (152 mm). Refer to Carlisle Spec Supplement G-03-11.

### 3.6 MEMBRANE PLACEMENT AND ATTACHMENT

- A. Unroll and position membrane without stretching. Allow the membrane to relax for approximately 1/2 hour prior to attachment. Provide and secure both perimeter and field membrane sheets in accordance with the manufacturer's most current specifications and details.
- B. Secure the membrane (along the pre-printed blue line approximately 3" from the edge of the membrane sheet) with the required Sure-Seal Fastener and Carlisle securement plate or bar spaced a maximum of 12" on center. The minimum distance between the edge of the fastening plate and the edge of the membrane must be 2 inches.
- C. Install adjoining membrane sheets in the same manner in accordance with the manufacturer's specifications.

### 3.7 MEMBRANE SPLICING (Tape Splice)

- A. Overlap adjacent sheets and mark a line 1/2 inch out from the top sheet.
- B. Fold the top sheet back and clean the dry splice area (minimum 2 1/2 inches (64 mm wide) of both membrane sheets with Sure-Seal Primer as required by the membrane manufacturer.
- C. Where Splice Tape is not Factory-Applied, apply Splice Tape to bottom sheet with the edge of the release film along the marked line. Press tape onto the sheet using hand pressure. Overlap tape roll ends a minimum of 1 inch.
- D. Remove the release film and press the top sheet onto the tape using hand pressure.
- E. Roll the seam toward the splice edge with a 2 inch (51 mm) wide steel roller.
- F. Install Pressure-Sensitive "T" Joint Covers, a 6 inch wide section of Pressure-Sensitive Flashing or Elastoform Flashing over all field splice intersections. Followed by a 12 inch wide section of Pressure-Sensitive Flashing or Elastoform Flashing.
- G. When using non-Pressure-Sensitive Elastoform Flashing, seal edges of flashing with Lap Sealant.
- H. The use of Lap Sealant with tape splices is optional except at tape overlaps and cut edges of reinforced membrane where Lap Sealant is required.

### 3.8 FLASHING

- A. Wall and curb flashing shall be cured EPDM membrane. Continue the deck membrane as wall flashing where practicable.
- B. Follow manufacturer's typical flashing procedures for all wall, curb, and penetration flashing including metal edging/coping and roof drain applications.
- C. Wall and curb flashing shall be cured EPDM membrane. Continue the deck membrane as wall flashing where practicable. At all angle change that exceeds 2-inches in one horizontal foot, and at other penetrations in accordance with Carlisle's details. Additional membrane securement may be provided by Pressure-Sensitive RUSS (Reinforced Universal Securement Strip) or Seam Fastening Plates fastened to substrate no more than 6-inches on center.
- D. Follow manufacturer's typical flashing procedures for all wall, curb, and penetration flashing including metal edging/coping and roof drain applications as out lined in Carlisle's latest version of the "Spec Supplement".
- D. Sheet Metal Counter Flashing:
  - 1. Fabricate and install new .032 mil finished aluminum counter flashings at equipment curbs as needed to complete this project meeting Carlisle, NRCA and SMACNA recommendations, specifications and details.
- E. Metal edging and copings shall be installed according to coping manufacturer, SMACNA specifications, ES-1 and ANSI/SPRI/FM 4435/ES-1.
- F. **Contractor is responsible for completing all roof system flashing details as required to obtain total roof system warranty as specified.**

### 3.9 WALKWAYS

- A. Install walkways at all traffic concentration points (such as roof hatches, access doors, rooftop ladders, etc.) and all locations to alleviate roof damage.

- B. Project specific walkway installation on new roof areas:
  1. Install 30" x 30" walkway pads at all ladders and roof access points in a 5' 2" square pattern leaving a drainage gap between walkway pads.
  2. Install 30" x 30" walkway pads in a continuous pattern around all mechanical roof top units and units with access doors.
- C. Fully adhere walkways pads to the EPDM membrane using membrane primer and EPDM seam glue in addition to the manufacturer's current application guidelines.

### 3.10 PAVER WALKWAYS

- A. Install Paver walkways at roof access doors and all locations to alleviate roof damage.
- B. For the protection of the deck membrane, install a slip-sheet of roofing membrane under all concrete pavers designated for use as a walkway. The protective layer must extend a minimum of 2" on each side of the walkway.
- C. Install second layer of protection using HP Protection Mat to elevate pavers above water.

### 3.11 PIPE SUPPORTS

- A. Clear the roof surface of foreign materials in large enough area enabling the base to sit flat on roof surface.
- B. The following are to be used as minimum placement recommendations.
  1. Install pipe supports within 1' of elbows, pipe joints and unions.
  2. For pipe diameters of 2" to 5" space supports at a distance of 10' apart.
  3. For pipe diameters of 1 1/2" space supports at a distance of 8' apart.
  4. For pipe diameters less than 1 1/2" space supports at a distance of 6' apart.

### 3.12 EDGE METAL INSTALLATION

- A. Install in accordance with manufacturer's installation instructions.
- B. Install in accordance to ANSI/SPRI ES-1 Standard to comply with the International Building Code and ANSI/SPRI/FM 4435/ES-1 - Wind Design Standard for Edge Systems Used with Low Slope Roofing System.
- C. Use provided fasteners consistent with manufacturer's instructions, suitable for the substrate to meet specified performance requirements.
- D. Project specific minimum fastening for the SecurEdge 2000 edge metal:
  1. Install manufacturer's formed retainer bar with 12" o.c. with corner fastening 6" o.c. At retainer bar ends install one fastener in each end using pre-punched holes. Fasteners shall be #9 x 1 1/2" minimum stainless steel screws with neoprene sealed washers.
  2. Install concealed joint splices, miters and ends per manufacturer's specification and details.

- E. Install water cut-off, as recommended by the membrane manufacturer, under the anchor bar / retainer bar. Carlisle Detail U-1E, SecurEDGE 2000.

### 3.13 DAILY SEALS

- A. On phased roofing, when the completion of flashings and terminations is not achieved by the end of the work day, a daily seal must be performed to temporarily close the membrane to prevent water infiltration. Refer to Carlisle's Spec Supplement G-07-11 "Daily Seal / Clean Up".
- B. Use Sure-Seal Pourable Sealer or other acceptable membrane seal in accordance with the manufacturer's requirements.

### 3.14 CLEAN UP

- A. Perform daily clean-up to collect all wrappings, empty containers, paper, and other debris from the project site. Upon completion, all debris must be disposed of in a legally acceptable manner.
- B. Prior to the manufacturer's inspection for warranty, the applicator must perform a pre-inspection to review all work and to verify all flashing has been completed as well as the application of all caulking.

### 3.15 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

### 3.16 PROJECT CLOSEOUT

- A. Contractor shall coordinate final roof inspection for warranty with the roof manufacture and building owner's representative so that all are present at the time of inspection.
- B. Contractor shall provide documentation and contact information for contractors two year contractor's warranty as referenced in the warranty section of project specifications.
- C. Prior to the manufacturer's inspection for warranty, the applicator must perform a pre-inspection to review all work and to verify all flashing has been completed as well as the application of all caulking.
- D. Final Roof Inspection: Arrange for roofing system manufacturer's quality assurance specialist and technical personnel to inspect each roofing installation on completion.

END OF SECTION

