

# PROJECT MANUAL

## PROJECT NAME AND LOCATION:

**OFFICE FLAT ROOF REPLACEMENT REBID  
COVE EAST APARTMENTS**

**Contract Number: DW2302531**

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# INVITATION TO BID

King County Housing Authority (KCHA) will accept bids from qualified general contractors to furnish labor, materials and necessary equipment to perform the following:

**SCOPE OF WORK:** Work includes, but is not limited to, replacement of all areas of roofing material at the office building including canopy and other tasks as described in the bid documents.

**PROJECT MANUAL DISTRIBUTION:**

Address: King County Housing Authority, 600 Andover Park, Seattle, WA 98188  
Distribution: \* Documents are available for download on KCHA's website at <http://www.kcha.org/business/construction/open/>

**PRE-BID CONFERENCE:**

Date and Time: 4/20/2023 at 10:00 A.M.  
Jobsite Address: Cove East Apartments, 33030 1st Ave S, Federal Way, WA 98003.  
In Addition: Contractors are strongly encouraged to attend the Pre-Bid Conference. Failure to attend the Conference will not relieve the Contractor of any responsibility for information provided at that time.  
For Questions: Questions pertaining to the bid are to be sent via email to [MichelleJ@kcha.org](mailto:MichelleJ@kcha.org) no later than seven (7) calendar days prior to bid due date. All responses shall be in the form of Addenda.  
Posting: Addenda will be posted on KCHA's website.

**BIDS ARE DUE:**

Time: **2:00 pm**  
Date: **May 11, 2023**

Submittal Process: \* Bids may be sent to Michelle Jackson via email to [MichelleJ@kcha.org](mailto:MichelleJ@kcha.org).

Process: All Bids must be received by KCHA no later than the above due date and time. No Bids will be accepted after that date and time.

**BID GUARANTEE:** Not Required.

**PERFORMANCE AND PAYMENT BONDS:** As a condition of award Performance and Payment bonds for 100% of the Contract Award Amount shall be furnished for the Work. On contracts of one hundred fifty thousand dollars (\$150,000.00) or less, at Contractors option the requirement may be waived in lieu of an additional 5% (total 10%) retainage.

KCHA is an Equal Employment Opportunity Employer and strongly encourages minority-owned and women-owned businesses, socially and economically disadvantaged businesses, and small businesses to submit bids or to participate as subcontractors and suppliers on KCHA Contracts.

KCHA reserves the right to reject any or all bids or to waive any informality in the bidding. No bid shall be withdrawn for a period of 60 calendar days subsequent to the opening of the bids without the written consent of KCHA.

**CONTACT PERSON:** Michelle Jackson at [MichelleJ@kcha.org](mailto:MichelleJ@kcha.org)

# SPECIFICATIONS

**Roofing Replacement Flat Roof  
Cove East Apartments – Office Building**

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## SECTION 01100 - SUMMARY

### PART 1 - GENERAL

#### 1.1 WORK COVERED BY CONTRACT DOCUMENTS

- A. Project Identification: Cove East Office Building Roofing Replacement
- B. Project Location: Cove East Apartments, 33030 1<sup>st</sup> Ave South, Federal Way, WA 98003
  - 1. Office Building: Approximately 2,695 square feet. Bidder responsible to verify all dimensions and quantity take-offs prior to submitting bid. Owner assumes no responsibility for quantities.
- C. Work includes but is not limited to:
  - 1. Replacement of all areas of roofing material at the office building including canopy.
  - 2. Removal of roofing material, flashing, wall caps, roof penetration flashing, vents and all accessories.
  - 3. Maintain all conduit and piping that is surface run, to be reinstated after new roofing is installed. PVC pipe to be discarded.
  - 4. Removal and replacement of all plywood with 5/8" CDX plywood roof sheathing.
  - 5. Repair damaged or rotted roof framing. (See 1.7 Unit Price No. 1)
  - 6. Replace damaged or rotted fascia board. (See 1.7 Unit Price No. 2)
  - 7. Remove and discard PVC piping that is mounted to parapet wall.
  - 8. Supply and installation:
    - a. PVC Membrane Roofing System according to manufacturer's specifications. See Versico's Landmark PVC, Mule Hyde 60-mil Reinforced PVC, and Sarnafil G410 60 PVC Specifications attached. Note: Request for alternate equivalent manufacturer to be reviewed if submitted prior to question deadline as noted in invitation to bid notice.
    - b. Perimeter curbing and coping and metal wall cap, metal gauge to match existing.
    - c. Roof penetrations & flashing.
    - d. All exhaust vents.
    - e. Fall arrest/restraint anchors.
    - f. Scuppers and Downspouts. Downspouts to be (3) inch Schedule 40 PVC pipe painted to match building brown color.
    - g. Parapet wall cap & flashing.
    - h. All necessary equipment and safety measures to perform work meeting WISHA and code requirements.

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### 1.2 WORK SEQUENCE

- A. The Work shall be completed in 30 calendar days from the date of Notice to Proceed.
  - 1. Contractor shall be entitled to an equitable adjustment in the Contract Time for changes in the time of performance directly attributable to severe weather conditions. For additional days to be considered the Contractor shall notify the Owner no later than 8:00 a.m. on each day of a severe weather condition.
- B. Contractor will submit written schedule outlining dates and duration of job including:
  - 1. Construction start date
  - 2. Schedule for work in each building
  - 3. Anticipated final completion date

### 1.3 LIQUIDATED DAMAGES

- A. Liquidated damages will be assessed for each calendar day that the Contractor exceeds the time for completion in the amount of \$250.

### 1.4 WORK RESTRICTIONS

- A. Use of the Premises
  - 1. Use of Site: Limit use of premises to work areas. Do not disturb portions of site beyond areas in which the Work is indicated.
    - a. Owner Occupancy: Allow for resident occupancy of site. Owner will occupy site and existing building during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate resident usage.
    - b. Driveways and Entrances: Keep driveways and entrances serving premises clear and available to residents and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
  - 2. Use of Existing Building: Maintain existing building in a weathertight condition throughout construction period. Repair damage caused by construction operations. Protect property, the buildings and occupants during construction period.
- B. Occupancy Requirements
  - 1. Full Owner Occupancy: Owner and tenants will occupy site and existing building during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner and tenant usage. Perform the Work so as not to interfere with Owner's operations.

### 1.5 PERMITS

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- A. Contractor is responsible for obtaining and paying for all permits and for the coordination of all required inspections.
- B. Prepare and file necessary plans, prepare documents and obtain necessary approvals of Authorities Having Jurisdiction (AHJ). Obtain required certificates of inspection for work and deliver to the Owner before request for acceptance and final payment for the work.

### 1.6 CONTRACT MODIFICATION PROCEDURES

- A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
- B. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change.
- C. Construction Change Directive: Owner may issue a Construction Change Directive instructing the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
- D. Documentation: Maintain detailed records required for a change order to be approved and provide evidence of the following:
  - 1. Wage Rates
  - 2. Hours worked for each trade
  - 3. Materials
  - 4. Equipment
- E. Do not perform change order Work without approval of the Owner. Work performed without approval will not be compensated.

### 1.7 UNIT PRICES

- A. Unit price is an amount, stated by bidders on the Form of Proposal, as a price per unit of measurement for materials or services added to or deducted from the Contract Sum if the estimated quantities of Work required by the Contract Documents are increased or decreased. Unit prices will be used to determine the amounts due to the Contractor from the Owner.
- B. Unit prices include necessary material, plus cost for delivery, preparations required for installation, demolition, disposal, installation, insurance, and direct and indirect costs associated with the Unit Price item including all fees and over-head costs.
- C. The Owner reserves the right to accept or reject any Unit Prices during the term of the Contract. If the Owner rejects a Unit Price, then the Contractor shall be required to submit to the Owner a breakdown of costs for the activity covered by the Unit Price. The Owner then shall make a determination as to what costs are allowable.
- D. Unit Price List
  - 1. Unit Price No. 1 – Roof Framing Replacement – 2x Framing Lumber

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- a. Unit of measure – 1 Lineal Foot.
  - b. The base bid includes replacement of 20 lineal feet of framing lumber to be used for deteriorated roof framing.
  - c. If, on inspection, the number of feet required is reduced by the Owner, the Unit Price will be used as a deductive.
  - d. In the event additional framing installation is required by the owner, the Unit Price will be used as an additive.
2. Unit Price No. 2 – Fascia Board Replacement – 1x8 White Wood
- a. Unit of measure – 1 Lineal Foot.
  - b. The base bid includes replacement of 10 lineal feet of fascia to be used for deteriorated fascia board.
  - c. If, on inspection, the number of feet required is reduced by the Owner, the Unit Price will be used as a deductive.
  - d. In the event additional fascia installation is required by the owner, the Unit Price will be used as an additive.
- E. Obtain approval from the Owner prior to performing added Work. Work performed without approval will not be compensated.

### 1.8 PAYMENT PROCEDURES

- A. Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.
- B. Each Application for Payment shall be consistent with previous applications and payments.
- C. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.
- D. Waivers of Lien: With each Application for Payment, submit conditional waivers lien from every entity that is lawfully entitled to file a lien arising out of the Contract and related to the Work covered by the payment.
  1. Submit partial waivers on each item for amount requested, before deduction for retainage, on each item.
  2. When an application shows completion of an item, submit final or full waivers.
  3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
    - a. Submit final Application for Payment with or preceded by final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
- E. Final Payment Application: Submit final Application for Payment with releases and close out supporting documentation.

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### 1.9 PROJECT MEETINGS

- A. Preconstruction Conference: Schedule a preconstruction conference before starting construction, at a time convenient to Owner, but no later than 7 days after execution of the Agreement.
- B. Progress Meetings: Conduct progress meetings at weekly intervals.

### 1.10 SUBMITTALS

- A. Provide product data for each element of construction and type of product or equipment for approval by Owner.
- B. Subcontract list. Prepare written information that demonstrates capabilities and experience of firm or persons.
- C. Contractors project manager and/or supervisors. Prepare written information that demonstrates capabilities and experience of firm or persons.
  - 1. The Owner will review subcontractors and assigned staff and will accept or reject based on experience or qualifications.
- D. Follow Washington Industrial Safety and Health Act (WISHA) regional directives and provide a site-specific safety program that will require an accident prevention and hazard analysis plan for the contractor and each subcontractor on the work site. The Contractor shall submit a site-specific Accident Prevention Program (APP) to the Owner's representative prior to the initial scheduled construction meeting.

### 1.11 TEMPORARY FACILITIES

- A. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking-water fixtures. Comply with regulations and health codes for type, number, location, operation, and maintenance of fixtures and facilities.
- B. Barricades, Warning Signs and Lights: Comply with standards and code requirements for erection of structurally adequate barricades. Paint with appropriate colors, graphics and warning signs to inform personnel and the public of the hazard being protected against.
- C. Use of Owner's existing electric power service will be permitted, as long as equipment is maintained in a condition acceptable to Owner.
- D. Four parking spaces shall be available to the contractor for storage containers and parking. Do not park in marked tenant spaces.

### 1.12 CONSTRUCTION WASTE MANAGEMENT

- A. Regulatory Requirements: Conduct construction waste management activities in accordance with State of Washington RCW 39.04.13, and all other applicable laws and ordinances.

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### B. Performance Requirements

1. General: Where possible divert CDL waste from the landfill by one, or a combination of the following activities: Salvage, Reuse, Source-Separated CDL Recycling, Co-mingled CDL Recycling.

### C. Removal of Construction Waste Management

1. Remove CDL waste materials from project site on a regular basis. Do not allow CDL waste to accumulate on-site.
2. Transport CDL waste materials off Owner's property and legally dispose of them.
3. Burning of CDL waste is not permitted.

## 1.13 EXECUTION REQUIREMENTS

- A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.

## 1.14 CUTTING AND PATCHING

### A. Quality Assurance

1. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.
2. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Owner's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

### B. Performance

1. Cutting: Cut existing construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
2. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.
  - a. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
  - b. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.



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### 1.15 DEMOLITION

- A. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work. A Limited Asbestos Survey dated October 9, 2020 is included in the specifications. Comply with all applicable laws regarding removal and disposal of hazardous materials.
1. If materials suspected of containing hazardous materials are encountered, do not disturb and immediately notify Owner.

### 1.16 CLOSEOUT PROCEDURES

- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
1. Prior to acceptance of the work at each building, clean project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
- B. Prior to final acceptance and final payment, Contractor shall submit a written warranty covering all labor and materials for a period of one (1) year from final completion.
- C. Provide manufacturer's 20 year Total System Warranty covering both labor and material with no dollar limitation. The maximum wind speed coverage shall be peak gusts of 55 mph measured at 10 meters above ground level. Certification is required with bid submittal indicating the manufacturer has reviewed and agreed to such wind coverage.

Pro-rated System Warranties shall not be accepted.

Evidence of the manufacturer's warranty reserve shall be included as part of the project submittals for the specifier's approval.

### **PART 2 - PRODUCTS (See Versico VersiFlex PVC, Mule Hyde 60-mil Reinforced PVC, and Sarnafil G410 60 Specifications attached.)**

- a. Note: Request for alternate equivalent manufacturer to be reviewed if submitted prior to question deadline as noted in invitation to bid notice.

### **PART 3 - EXECUTION (See Versico VersiFlex PVC, Mule Hyde 60-mil Reinforced PVC, and Sarnafil G410 60 Specifications attached.)**

END OF SECTION 01100

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## SECTION 06100 - ROUGH CARPENTRY

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section includes the following:
1. Roof Framing Lumber
  2. Plywood sheathing
  3. Fascia

### PART 2 - PRODUCTS

#### 2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of lumber grading agencies certified by the American Lumber Standards Committee Board of Review.

#### 2.2 SHEATHING

- A. Plywood Roof Sheathing: Exterior, Structural sheathing.
- B. CDX Plywood panel roof sheathing: Minimum of (1/2") inch thick, identified with the appropriate APA trademark. Each panel should meet the requirements of the latest edition of the U.S. Product Standard PS-1 for Construction and Industrial Plywood, or APA PRP-108 Performance Standards.

#### 2.3 MISCELLANEOUS MATERIALS

- A. Fasteners and Baffles:
1. Where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
  2. Power-Driven Fasteners: CABO NER-272.
  3. Plywood clips.
  4. Roof Anchors – OSHA Compliant 1910, 1926 Subpart M, Capacity 130-420 lbs.

### PART 3 - EXECUTION

#### 3.1 DEMOLITION

ROUGH CARPENTRY

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## SPECIFICATIONS

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- A. Remove all existing roofing materials, underlayment, flashing, drainage system and downspouts.
- B. Remove all attic static vents.
- C. Remove all plumbing vents, bathroom and kitchen fan vents.

### 3.2 INSTALLATION

- A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Replace any deteriorated roof framing.
- B. Secure all static vent locations and plumbing, bath and kitchen fan vent locations.
- C. Securely attach rough carpentry work and new 1/2" plywood sheathing as needed to roof framing by anchoring and fastening as indicated, complying with the following:
  - 1. Published requirements of metal framing anchor manufacturer.
  - 2. IRC Section R905.2.6.Fastening Methods.
  - 3. Sheathing: Nail to wood framing.
  - 4. Roof Anchors: Nailed to solid wood not plywood.
  - 5.

END OF SECTION 06100

## SPECIFICATIONS

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### SECTION 07540 – THERMOPLASTIC POLYVINYL CHLORIDE (PVC) MEMBRANE ROOFING

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. This Section includes PVC Roofing.
- B. See Versico's VersiFlex PVC Cove East Specifications attached separately for specification details.
  - 1. VersiFlex PVC Adhered Roofing System
  - 2. 1/2" Coverboard
  - 3. FRS 60 mil thick gray fiberglass reinforced PVC membrane
  - 4. Flashings and insulation as specified.
  - 5. Fasteners.
  - 6. Accessories

END OF SECTION 07311

## SPECIFICATIONS

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### SECTION 07620 - SHEET METAL FLASHING AND TRIM

#### PART 1 - GENERAL

##### 1.1 SUMMARY

A. This Section includes the replacement of all metal flashing as follows:

1. Formed roof drainage system.
2. Roof flashing and edging

##### 1.2 SUBMITTALS

A. Product Data: For each product indicated.

##### 1.3 QUALITY ASSURANCE

A. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual." Conform to dimensions and profiles shown unless more stringent requirements are indicated.

#### PART 2 - PRODUCTS

##### 2.1 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation.
- B. Elastomeric Sealant: ASTM C 920, elastomeric polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

##### 2.2 FABRICATION, GENERAL

A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated. Shop fabricate items.

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### 2.3 SHEET METAL FABRICATIONS

- A. See Versico's FersiFlex PVC Landmark Roofing specifications for details.

### 2.4 ROOF DRAINAGE SHEET METAL FABRICATIONS

- A. Hanging Gutters: 5-inch K-Style, 027 gauge aluminum, continuous aluminum gutter complete with end pieces, outlet tubes, and other accessories as required. Fabricate on-site, with no seams. Fabricate gutter accessories from same metal as gutters.
1. Fabricate gutters from: 0.027-inch thick aluminum with baked on finish (Owner to select color from standard range).
  2. Hanger Style: Aluminum quick screw hanger with 3-inch hex head screw.
  3. Spacers between fascia and gutter: 0.024-inch thick aluminum with baked on finish.
  4. Approximately 260 lineal feet of gutter on each building. Bidder responsible to verify all dimensions and take off quantities on site prior to submitting bid. Owner not responsible for any quantity take offs.
- B. Downspouts: Standard 2" x 4" rectangular downspouts complete with front and side elbows. Furnish with metal straps from same material as downspouts.
1. Fabricate downspouts from: 0.027-inch thick aluminum with baked on finish (Owner to select color from standard range).
  2. Each building to have 7 total downspouts connected to the existing drainage pipe system, 4 downspouts in the front and 3 downspouts in the back.
- C. Sealant: Geocel 2000 or approved equal.

## PART 3 - EXECUTION

### 3.1 INSTALLATION, GENERAL

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
1. Torch cutting of sheet metal flashing and trim is not permitted.
- B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by fabricator or manufacturers of dissimilar metals.
- C. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
- D. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and elastomeric sealant.

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- E. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
- F. Fasteners: Use fasteners of sizes that will penetrate substrate not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws.
- G. Seal joints with elastomeric sealant as required for watertight construction.

### 3.2 METAL FLASHING INSTALLATION

- A. General: Install sheet metal roof flashing and trim to comply with performance requirements of ANSI/SPRI ES-1 standards and comply with International Building Code.
- B. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof.

### 3.3 ROOF DRAINAGE SYSTEM INSTALLATION

- A. General: Install sheet metal roof drainage items to produce complete roof drainage system according to SMACNA recommendations and as indicated. Coordinate installation of roof perimeter flashing with installation of roof drainage system. Install downspouts and plumb.
- B. Hanging Gutters: Attach gutters at eave or fascia to firmly anchored gutter brackets spaced not more than 36-inches apart. Crimped and sealed end caps and downspout flanges with a heavy bead of non-curing sealant.
  - 1. Anchor gutter with quick screw hanger with 3-inch hex head screw spaced not more than 24-inches apart.
  - 2. Slope gutters to downspouts.
  - 3. When specified use a “Y” attachment to connect two gutters to a single downspout.
- C. Downspouts: Join sections with 1-1/2-inch telescoping joints. Provide hex head screws to securely strap to building and downspouts; locate fasteners at top and bottom and at approximately 60-inches o.c. in between.
  - 1. Provide elbows at base of downspout to direct water away from building if no site drainage is present.
  - 2. Connect downspouts to underground drainage system if available.
- D. See Landmark Building Plans for locations of all downspouts.

END OF SECTION 07620

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### SECTION 07720 - ROOF ACCESSORIES

#### PART 1 - GENERAL

##### 1.1 SUMMARY

A. This Section includes the following:

1. Attic Vents – Versico One-way pressure relief breather vents.
2. Plumbing & Fan Vents – Versico PVC T-Top and Square Top vents
3. Flashing – VersiFlex reinforced membrane

##### 1.2 SUBMITTALS

A. Product Data: For each product indicated.

##### 1.3 QUALITY ASSURANCE

A. Standards: Comply with the following:

1. SMACNA's "Architectural Sheet Metal Manual" details for fabrication of units, including flanges and cap flashing to coordinate with type of roofing indicated.
2. NRCA's "Roofing and Waterproofing Manual" details for installing units.

#### PART 2 - PRODUCTS

##### 2.1 ATTIC VENTS

A. Versico One-way pressure relief breather vents, per manufacturer's recommendations, 2 vents per building spaced evenly.

##### 2.2 PLUMBING VENTS, FAN VENTS & FLASHING

- A. Plumbing vents, bathroom and kitchen fan vents to match existing sizes. Install Versico PVC T-Top and Square Top vents following manufacturer's recommendations.
- B. Flashing of parapets, curbs, expansion joints and other parts of the roof must be performed using VersiFlex reinforced membrane.
- C. VersiFlex non-reinforced membrane can be used for flashing pipe penetrations, sealant pockets, scuppers, as well as inside and outside corners, when the use of pre-molded accessories is not feasible.



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### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Install attic vents, bath and kitchen vents, and pipe boots.
- B. General: Coordinate installation of roof accessories with installation of roofing, flashing, penetrations, equipment, and other construction to ensure that combined elements are waterproof and weathertight. Anchor roof accessories securely to supporting structural substrates so they are capable of withstanding lateral and thermal stresses, and inward and outward loading pressures.
- C. Connect bath and kitchen vents to existing duct work securely.
- D. Report any deficiencies in duct work, insulation or attic ventilation to Owner.

END OF SECTION 07720

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### SECTION 09911 - PAINTING

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. This Section includes field painting of new exposed exterior fascia.

##### 1.2 SUBMITTALS

- A. Product Data: For each product indicated.

#### PART 2 - PRODUCTS

##### 2.1 PREPARATORY COATS

- A. Exterior Primer: Exterior alkyd or latex-based primer of finish coat manufacturer and recommended in writing by manufacturer for use with finish coat and on substrate indicated.
1. Ferrous-Metal and Aluminum Substrates: Rust-inhibitive metal primer.
  2. Zinc-Coated Metal Substrates: Galvanized metal primer.
- B. Caulking: WL001360A - Sher-MAX Ultra Urethanized Elastomeric Sealant White.

##### 2.2 EXTERIOR FINISH COATS

- A. Exterior Low-Luster Acrylic Paint: Sherwin-Williams; SuperPaint Exterior Latex Satin Wall Paint A89 Series.

#### PART 3 - EXECUTION

##### 3.1 APPLICATION

- A. Comply with procedures specified in PDCA P4 for inspection and acceptance of surfaces to be painted.
- B. Visible plywood shall match existing color.
- C. No exterior painting should be done immediately after a rain, during foggy weather, when rain is predicted, or when the temperature is below 50°F, unless products are designed specifically for these conditions.

## SPECIFICATIONS

**Roofing Replacement Flat Roof  
Cove East Apartments – Office Building**

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- D. Caulk all splits, cracks and nail holes.
- E. Prime Coats: Before applying finish coats, prime as recommended by manufacturer.
  - 1. Prime all bare material.
- F. Application Procedures: Apply by sprayer one heavy coat with back roll on the body to achieve a minimum dry film thickness of 6 mils or as necessary to achieve manufacturer's warranty.
- G. Protect property from overspray. Contractor is responsible and shall pay for all property damage including cars, walkways, patios and landscaping.

### 3.2 CLEANING AND PROTECTING

- A. At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from Project site.
- B. Protect work of other trades, whether being painted or not, against damage from painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect.
- C. Provide "Wet Paint" signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to protect their work.
  - 1. After work of other trades is complete, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

END OF SECTION 09911

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# VERSICO - VersiFlex Cove East Apartments

## **PART 1 GENERAL**

### **1.01 DESCRIPTION**

- A. The Cove East Apartments is located at 33030 1st Ave South, Federal Way, WA 98003.
- B. The project consists of installing Versico's VersiFlex PVC Adhered Roofing System as outlined below:  
Apply the VersiFlex FRS Adhered Roofing System in conjunction with ½ inch coverboard after tear off of the existing asphalt shingle roof to expose the wood for verification of suitable substrate as specified in this specification.

### **1.02 EXTENT OF WORK**

- A. Provide all labor, material, tools, equipment, and supervision necessary to complete the installation of the VersiFlex FRS 60-mil thick gray fiberglass reinforced PVC (polyvinyl chloride) membrane adhered roofing system including flashings and insulation as specified herein and as indicated on the drawings in accordance with the manufacturer's most current specifications and details.
- B. The roofing contractor shall be fully knowledgeable of all requirements of the contract documents and shall make themselves aware of all job site conditions that will affect their work.
- C. The roofing contractor shall confirm all given information and advise the building owner, prior to bid, of any conflicts that will affect their cost proposal.
- D. Any contractor who intends to submit a bid using a roofing system other than the approved manufacturer must submit for pre-qualification in writing fourteen (14) days prior to the bid date. Any contractor who fails to submit all information as requested will be subject to rejection. Bids stating "as per plans and specs" will be unacceptable.

### **1.03 SUBMITTALS**

- A. Prior to starting work, the roofing contractor must submit the following:
  - 1. Shop drawings showing layout, details of construction and identification of materials.
  - 2. A sample of the manufacturer's Membrane System Warranty.
  - 3. Submit a letter of certification from the manufacturer which certifies the roofing contractor is authorized to install the manufacturer's roofing system and lists foremen who have received training from the manufacturer along with the dates training was received.
  - 4. Certification from the membrane manufacturer indicating the membrane thickness over the reinforcing scrim (top ply membrane thickness) is nominal .016-mil or thicker for PVC FRS.
  - 5. Certification of the manufacturer's warranty reserve.
- B. Upon completion of the installed work, submit copies of the manufacturer's final inspection to the specifier

prior to the issuance of the manufacturer's warranty.

#### **1.04 PRODUCT DELIVERY, STORAGE AND HANDLING**

- A. Deliver materials to the job site in the manufacturer's original, unopened containers or wrappings with the manufacturer's name, brand name and installation instructions intact and legible. Deliver in sufficient quantity to permit work to continue without interruption.
- B. Comply with the manufacturer's written instructions for proper material storage.
  - 1. Store VersiFlex membrane on provided pallets in the original undisturbed plastic wrap and cover with light colored breathable waterproof tarpaulins in a cool, shaded area. VersiFlex membrane that has been exposed to the elements must be prepared with Versico PVC cleaner prior to hot air welding.
  - 2. Store curable materials (adhesives and sealants) between 60°F and 80°F in dry areas protected from water and direct sunlight. If exposed to lower temperature, restore to 60°F minimum temperature before using.
  - 3. Store materials containing solvents in dry, well ventilated spaces with proper fire and safety precautions. Keep lids on tight. Use before expiration of their shelf life.
- C. Insulation must be on pallets, off the ground and tightly covered with waterproof materials.
- D. Any materials which are found to be damaged shall be removed and replaced at the applicator's expense.

#### **1.05 WORK SEQUENCE**

- A. Schedule and execute work to prevent leaks and excessive traffic on completed roof sections. Care should be exercised to provide protection for the interior of the building and to ensure water does not flow beneath any completed sections of the membrane system.
- B. Do not disrupt activities in occupied spaces.

#### **1.06 USE OF THE PREMISES**

- A. Before beginning work, the roofing contractor must secure approval from the building owner's representative for the following:
  - 1. Areas permitted for personnel parking.
  - 2. Access to the site.
  - 3. Areas permitted for storage of materials and debris.
  - 4. Areas permitted for the location of cranes, hoists and chutes for loading and unloading materials to and from the roof.
- B. Interior stairs or elevators may not be used for removing debris or delivering materials, except as authorized by the building superintendent.

#### **1.07 EXISTING CONDITIONS**

If discrepancies are discovered between the existing conditions and those noted on the drawings, immediately notify the owner's representative by phone and solicit the manufacturer's approval prior to commencing with the work. Necessary steps shall be taken to make the building watertight until the discrepancies are resolved.

#### **1.08 PRECONSTRUCTION CONFERENCE**

- A. A pre-bid meeting will be held at the job site. See Invitation to Bid for details.
- B. Prior to bid submittal, the roofing contractor should schedule a job site inspection to observe actual conditions and verify all dimensions on the roof. The job site inspection may occur on the day of the pre-bid meeting or prior to such a meeting. Should access to the roof be necessary before or after the pre-bid meeting, the contractor must contact the owner's representative, Lance Drago, Project Manager, at 206-315-4398 to coordinate an appropriate time.
- C. Bids must be submitted per directions in Invitation to Bid.
- D. Any conditions which are not shown on the shop drawings should be submitted as questions prior to bid submittal per instructions included in Invitation to Bid.

## **1.09 TEMPORARY FACILITIES AND CONTROLS**

- A. Temporary Utilities:
  - 1. Water and power for construction purposes are available at the site and will be made available to the roofing contractor.
  - 2. Provide all hoses, valves and connections for water from a source designated by the owner when made available.
  - 3. When available, electrical power should be extended as required from the source. Provide all trailers, connections and fused disconnects.
- B. Temporary, Sanitary Facilities  
Sanitary facilities will not be available at the job site. The roofing contractor shall be responsible for the provision and maintenance of portable toilets or their equal.
- C. Building Site:
  - 1. The roofing contractor shall use reasonable care and responsibility to protect the building and site against damages. The contractor shall be responsible for the correction of any damage incurred as a result of the performance of the contract.
  - 2. The roofing contractor shall remove all debris from the job site in a timely and legally acceptable manner so as to not detract from the aesthetics or the functions of the building.
- D. Security:  
Obey the owner's requirements for personnel identification, inspection and other security measures.

## **1.10 JOB SITE PROTECTION**

- A. The roofing contractor shall adequately protect building, paved areas, service drives, lawn, shrubs, trees, etc. from damage while performing the required work. Provide canvas, boards and sheet metal (properly secured) as necessary for protection and remove protection material at completion. The contractor shall repair or be responsible for costs to repair all property damaged during the roofing application.
- B. During the roofing contractor's performance of the work, the building owner will continue to occupy the existing building. The contractor shall take precautions to prevent the spread of dust and debris, particularly where such material may sift into the building. The roofing contractor shall provide labor and materials to

construct, maintain and remove necessary, temporary enclosures to prevent dust or debris in the construction area(s) from entering the remainder of the building.

- C. Do not overload any portion of the building, by either use of or placement of equipment, storage of debris, or storage of materials.
- D. Protect against fire and flame spread. Maintain proper and adequate fire extinguishers.
- E. Take precautions to prevent drains from clogging during the roofing application. Remove debris at the completion of each day's work and clean drains, if required. At completion, test drains to ensure the system is free running and drains are watertight. Remove strainers and plug drains in areas **where work is in progress**. Install flags or other telltales on plugs. Remove plugs each night and screen drain.
- F. Store moisture susceptible materials above ground and protect with waterproof coverings.
- G. Remove all traces of piled bulk material and return the job site to its original condition upon completion of the work.

### 1.11 SAFETY

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.

### 1.12 WORKMANSHIP

- A. Applicators installing new roof, flashing and related work shall be factory trained and approved by the manufacturer they are representing.
- B. All work shall be of highest quality and in strict accordance with the manufacturer's published specifications and to the building owner's satisfaction.
- C. There shall be a supervisor on the job site at all times while work is in progress.

### 1.13 QUALITY ASSURANCE

- A. The VersiFlex Membrane Roofing System must achieve a UL Class B.
- B. The specified roofing assembly must have been successfully tested by a qualified testing agency to resist the design uplift pressures calculated according to  
  
ANSI/SPRI WD-1 "Wind Design Standard Practice for Roofing Assemblies"  
American Society of Civil Engineers (ASCE 7)  
International Building Code (IBC)
- C. Unless otherwise noted in this specification, the roofing contractor must strictly comply with the manufacturer's current specifications and details.
- D. The roofing system must be installed by an applicator authorized and trained by the manufacturer in compliance with shop drawings as approved by the manufacturer. The roofing applicator shall be thoroughly experienced and upon request be able to provide evidence of having at least five (5) years successful experience installing single-ply PVC roofing systems and having installed at least one (1) roofing application or several similar systems of equal or greater size within one year.
- E. Provide adequate number of experienced workmen regularly engaged in this type of work who are skilled in the application techniques of the materials specified including operation of hot air welding equipment and

power supply. Provide at least one thoroughly trained and an experienced superintendent on the job at all times roofing work is in progress.

- F. There shall be no deviations made from this specification or the approved shop drawings without the prior written approval of the specifier. Any deviation from the manufacturer's installation procedures must be supported by a written certification on the manufacturer's letterhead and presented for the specifier's consideration.
- G. Upon completion of the installation, the applicator shall arrange for an inspection to be made by a non-sales technical representative of the membrane manufacturer in order to determine whether or not corrective work will be required before the warranty will be issued. Notify the building owner seventy-two (72) hours prior to the manufacturer's final inspection.

## **1.14 JOB CONDITIONS, CAUTIONS AND WARNINGS**

Refer to Versico's VersiFlex specification for General Job Site Considerations.

- A. Material Safety Data Sheets (MSDS) must be on location at all times during the transportation, storage and application of materials.
- B. 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.
- C. When loading materials onto the roof, the Versico Authorized Roofing Applicator must comply with the requirements of the building owner to prevent overloading and possible disturbance to the building structure.
- D. 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.
- E. 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.
- F. 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.
- G. 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.
- H. New roofing shall be complete and weather tight at the end of the work day.
- I. Contaminants such as grease, fats and oils shall not be allowed to come in direct contact with the roofing membrane.

## **1.15 WARRANTY**

- A. Provide manufacturer's 20 year Total System Warranty covering both labor and material with no dollar limitation. The maximum wind speed coverage shall be peak gusts of 55 mph measured at 10 meters above ground level. Certification is required with bid submittal indicating the manufacturer has reviewed and agreed to such wind coverage.
- B. Pro-rated System Warranties shall not be accepted.
- C. Evidence of the manufacturer's warranty reserve shall be included as part of the project submittals for the specifier's approval.



## **PART 2 PRODUCTS**

### **2.01 GENERAL**

- A. All components of the specified roofing system shall be products of Versico or accepted by Versico as compatible.
- B. All products (including insulation, fasteners, fastening plates, pre-fabricated accessories and edgings) must be **manufactured and supplied** by the roofing system manufacturer and covered by the warranty.

### **2.02 MEMBRANE**

- A. Furnish VersiFlex PVC FRS 60-mil thick gray, fiberglass reinforced PVC (polyvinyl chloride) membrane as needed to complete the roofing system. Membrane thickness over the reinforcing scrim (top-ply thickness) shall be nominal .016-mil or thicker.

### **2.03 COVERBOARD**

- A. The cover board shall be mechanically fastened to the substrate in accordance with the manufacturer's published specifications.
- B. Cover board shall be as supplied by Versico.

**Dens Deck Prime** –gypsum core that incorporates glass-mat facings on the top and bottom side. The top surface is pre-primed and provides excellent bond strength for adhered membrane for use as a cover board. Available in ¼” to 5/8” and 4’ x 4’ or 4’ x 8’ size boards.

### **2.04 FASTENING COMPONENTS**

To be used for mechanical attachment of cover board and to provide additional membrane securement:

#### **A. Fasteners, Plates and Bars**

1. **HPVX Fasteners:** A heavy duty #15 threaded fastener with a #3 phillips drive used for membranre or insulation securement into steel, wood plank or minimum 5/8 inch thick plywood when increased pullout resistance is desired.
2. **Term Bar Nail-Ins:** A 1-1/4” long expansion anchor with a zinc plated steel drive pin used for fastening the Versico Termination Bar or Seam Fastening Plates to concrete, brick, or block walls.
3. **HPVX Plates:** A 2-3/8” diameter metal barbed fastening plate used with Versico HPVX or MP-14-10 Fasteners for membrane securement. This plate can be used for insulation securement.

## 2.05 ADHESIVES, CLEANERS AND SEALANTS

All products shall be furnished by Versico and specifically formulated for the intended purpose.

- A. **VersiFlex PVC Bonding Adhesive:** A high-strength, synthetic rubber adhesive used for bonding VersiFlex membrane to various surfaces. The adhesive is applied to both the membrane and the substrate at a coverage rate of approximately 45 - 50 square feet per gallon per finished surface (includes coverage on both surfaces).
- B. **Low VOC PVC Bonding Adhesive:** A high strength solvent-based contact adhesive that allows bonding of PVC membrane to various porous and non-porous substrates. It is specially formulated using a blend of VOC exempt and nonexempt solvent to be in compliance with the state of California Clean Air Act of 1988 (updated in 1997) and as further regulated by California's Air Quality Control Districts listing VOC grams per liter limitations. This product also meets the <250 gpl VOC content requirements of the OTC Model Rule for Singel Ply Roofing Adhesives.
- C. **VersiFlex PVC Cut-Edge Sealant:** A clear-colored sealant used to seal cut edges of reinforced VersiFlex membrane. A coverage rate of approximately 225 - 275 linear feet per squeeze bottle can be achieved when a 1/8" diameter bead is applied.
- D. **Water Cut-Off Mastic:** Used as mastic to prevent moisture migration at drains, compression terminations and beneath conventional metal edging (at a coverage rate of approximately 10' per tube or 100' per gallon).
- E. **Universal Single-Ply Sealant:** A 100% solids, solvent free, one-part, polyether sealant that provides a weather tight seal to a variety of building substrates. Can be used as a termination bar sealant or for use in counterflashing, coping, and scupper details.
- F. **Foil Grip Aluminum Tape:** A general-purpose pressure-sensitive sealant used as a bond break at joints in PVC Coated Metal. Packaged in rolls 2" wide by 100' long.
- G. **PVC Membrane Cleaner:** Used to prepare membrane that has been exposed to the elements for approximately 7 days prior to heat welding or to remove general construction dirt at an approximate coverage rate of 400 square feet per gallon (one surface).
- H. **Cav-Grip Primer:** a low VOC contact adhesive used to prime surfaces for the application of 725TR.

## 2.06 METAL EDGING AND MEMBRANE TERMINATIONS

- A. **General:** All metal edging shall be tested and meet ANSI/SPRI ES-1 standards and comply with International Building Code.
- B. **Termination Bar:** a 1" wide and .098" thick extruded aluminum bar pre-punched 6" on center; incorporates a sealant ledge to support Lap Sealant and provide increased stability for membrane terminations.

## 2.07 WALKWAYS

Protective surfacing for roof traffic shall be VersiFlex PVC Walkway Rolls installed per manufacturer's requirements or concrete pavers loose laid over an approved slip sheet (pavers not recommended for slopes greater than 2" in 12").

## 2.08 OTHER MATERIALS

- A. **Versico 725TR Air & Vapor Barrier / Temporary Roof:** 725TR is a 40-mil composite consisting of 35-mils of self-adhering rubberized asphalt factory laminated to a 5-mil polyethylene film with an adhesion textured surface. 725TR roll dimensions are 39" x 75' and the product is applied after priming an acceptable substrate with CCW 702, 702-LV or Cav-Grip primer.
- B. One-Way Pressure Relief Breather Vents - 8" PVC Square Top Vents "Gray" Product Code 326881.
  - a. Versico's Weldable One-Way Pressure Relief Breather Vents are engineered to reduce moisture within the roofing system and release trapped air pressure within the building. One-Way Vents allow trapped air pressure to escape; Two-Way Vents (combined with One-Way Vents) help to reduce moisture.

## **PART 3 EXECUTION**

### **3.01 GENERAL**

- A. Comply with the manufacturer's published instructions for the installation of the membrane roofing system including proper substrate preparation, job site considerations and weather restrictions.
- C. Position sheets to accommodate contours of the roof deck and shingle splices to avoid bucking water.
- D. Inspect all existing plywood decking and confirm condition meets manufacturer requirements for substrate. Replace any deteriorated plywood sheets per Section 01100 1.7 Unit Prices.
- E. Install permanent roof anchors to meet OSHA requirements.

### **3.02 COVER BOARD PLACEMENT AND ATTACHMENT**

- A. Install cover board or membrane underlayment over the substrate with boards butted tightly together with no joints or gaps greater than 1/4 inch. Stagger joints horizontally and vertically if multiple layers are provided.

### **3.04 MEMBRANE PLACEMENT AND ATTACHMENT**

- A. Position VersiFlex membrane over the acceptable substrate. Fold membrane sheet back onto itself so half the underside of the membrane is exposed.
- B. Apply Bonding Adhesive in accordance with the manufacturer's published instructions, to the exposed underside of the membrane and the corresponding substrate area. Do not apply Bonding Adhesive along the splice edge of the membrane to be hot air welded over the adjoining sheet. Allow the adhesive to dry until it is tacky but will not string or stick to a dry finger touch.
  - 1. Roll the coated membrane into the coated substrate while avoiding wrinkles. Brush down the bonded section of the membrane sheet immediately after rolling the membrane into the adhesive with a soft bristle push broom to achieve maximum contact.
  - 2. Fold back the unbonded half of the sheet and repeat the bonding procedures.
- B. Position adjoining sheets to allow a minimum overlap of 2 inches to provide a minimum 1-1/2" hot air weld.
- C. Continue to install adjoining membrane sheets in the same manner, overlapping edges a minimum of 2 inches and complete the bonding procedures as stated previously.

### **3.05 MEMBRANE HOT AIR WELDING PROCEDURES**

- A. Heat weld the VersiFlex membrane using an Automatic Heat Welding Machine or Hot Air Hand Welder in accordance with the manufacturer's specifications. At all splice intersections, roll the seam with a silicone roller immediately after the welder causes the membrane step off to ensure a continuous hot air welded

seam.

- B. Probe all seams once the hot air welds have thoroughly cooled (approximately 30 minutes).
- C. Repair all seam deficiencies the same day they are discovered.
- D. Apply Cut Edge Sealant on all cut edges of reinforced membrane (where the scrim reinforcement is exposed) after seam probing is complete. Cut Edge Sealant is not required on vertical splices.

### **3.06 FLASHING**

- A. Flashing of parapets, curbs, expansion joints and other parts of the roof must be performed using VersiFlex reinforced membrane. VersiFlex non-reinforced membrane can be used for flashing pipe penetrations, Sealant Pockets, and scuppers, as well as inside and outside corners, when the use of pre-molded accessories is not feasible.
- B. Follow manufacturer's typical flashing procedures for all wall, curb, and penetration flashing including metal edging/coping and roof drain applications.

### **3.07 VENTS**

- A. For attic ventilation, install one-way pressure relief breather vents per manufacturers recommendations. Install 20 attic vents per building, 10 for each side, located near the top ridge, evenly spaced along the length of the building.
- B. Provide and install Versico PVC T-Top and Square Top Vents matched to the diameter of each existing stand pipes, plumbing vent, bath/kitchen fan vent and dryer vent.

### **3.08 WALKWAYS**

- A. Install walkways at all traffic concentration points (such as roof hatches, access doors, rooftop ladders, etc.) and all locations as identified on the specifier's drawing.
- B. Hot air weld walkway material to the membrane in accordance with the manufacturer's specifications.

### **3.09 DAILY SEAL**

- 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.
- B. Complete an acceptable membrane seal in accordance with the manufacturer's requirements.

### **3.10 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.

**END OF SPECIFICATION**



## G U I D E - S P E C

### Fully Adhered Roofing System

January 2022

This **GUIDE-SPEC** is a brief outline of Versico's VersiFlex™ Adhered Roofing System requirements and is intended for use as a submittal with a bid package. Specifiers and Versico Authorized Roofing Contractors must comply with the VersiFlex Specification prior to design or bid.

#### PART I GENERAL

##### 1.01 DESCRIPTION

**The VersiFlex Adhered Roofing System** incorporates maximum 10' wide, 50-, 60- or 80-mil thick Polyester or Fiberglass reinforced VersiFlex Polyvinyl Chloride (PVC) membrane (white, gray, light gray, slate gray and tan) OR 10' wide 50-, 60- or 80-mil thick Polyester Reinforced VersiFlex KEE HP (High Performance) membrane (white, gray, light gray, slate gray and tan). Versico Insulation is mechanically fastened to the roof deck or secured with an approved adhesive and the membrane is fully adhered to the substrate with VersiFlex Low VOC Bonding Adhesive, Hydrobond Water-Based Adhesive or CAV-GRIP PVC Aerosol Contact Adhesive. Adjoining sheets of membrane are overlapped and joined together with a minimum 1-1/2" wide heat weld.

##### 1.02 QUALITY ASSURANCE

- A. This roofing system must be installed by a Versico Authorized Contractor in compliance with shop drawings as approved by Versico.
- B. Upon request, an inspection shall be conducted by a Field Service Representative of Versico to ascertain that the membrane roofing system has been installed according to Versico's published specifications and details applicable at the time of bid. This inspection is to determine whether a warranty shall be issued. It is not intended as a final inspection for the benefit of the owner.
- C. For specific code approvals achieved with this system, refer to Versico's PVC Code Approval Guide, DORA (Directory of Roof Assemblies), FM Approvals or UL Fire Resistance Directory for Roofing Materials and Systems.

##### 1.03 SUBMITTALS

- A. To ensure compliance with Versico's minimum warranty requirements, the following projects should be forwarded to Versico for review prior to installation, preferably prior to bid.
  - 1. Air pressurized buildings, canopies, and buildings with large openings, cold storage buildings or freezer facilities, adhered roofing system projects over 100' in height or projects where the PVC membrane is expected to come in direct contact with petroleum-based products, waste products (i.e., grease, oil, animal fats, etc) and other chemicals.
- B. Shop drawings must be submitted to Versico by the Versico Authorized Roofing Contractor along with a completely executed Copy-A – Job Approval Request for approval. Approved shop drawings are required for inspection of the roof and on projects where on-site technical assistance is requested.

##### 1.04 GENERAL DESIGN CONSIDERATIONS

- A. It is the responsibility of the building owner or his/her designated representative to verify structural load limitation. In addition, a core cut may be taken to verify weight of existing components when the roofing system is to be specified on an existing facility.
- B. On new construction projects, especially in cold climate regions, moisture generated due to the construction process could adversely impact various components within the roofing assembly if not addressed. Refer to Design References DR-01-21 "Construction Generated Moisture" included in the Versico Technical Manual.
- C. On structural concrete decks, when a vapor retarder is not used, gaps in the deck along the perimeter and around penetrations must be sealed along with vertical joints between tilt-up panels, if present, to prevent infiltration of hot humid air and possible moisture contamination resulting from condensation. This is specifically important when adhesive is used to attach the roof insulation.

**CAUTION:** If left unaddressed, collected moisture could weaken insulation boards and facers resulting in a blow-off or increase the probability of mold growth.

- D. Vapor Retarders



1. Versico does not require a vapor retarder for the protection of the membrane; however, it should be considered by the specifier for the protection of the roofing assembly (i.e. primarily insulation, underlayment and adhesives). The following criteria should be considered by the specifier:
  - a. Use of a vapor retarder to protect insulation and reduce moisture accumulation within an insulated roofing assembly, should be investigated by the specifier.
  - b. In the generally temperate climate of the United States, during the winter months, water vapor flows upward from a heated, more humid interior toward a colder, drier exterior. Vapor retarders are more commonly required in northern climates than in southern regions, where downward vapor pressure may be expected and the roofing membrane itself becomes the vapor retarder.

### 1.05 WARRANTY

**Table I Adhered Membrane Systems Warranty Options**

Years	Thermoplastic Membranes (VersiFlex PVC/KEE HP PVC)				
	55, 72, 80 or 90 mph	100 mph	110 to 120 mph	Minimum Membrane Thickness (4)	Additional Puncture Coverage
	Adhered	Adhered	Adhered		
5,10, or 15 year	√	√	√	VersiFlex PVC/KEE HP PVC 50-mil (3)	Not Available - 80-mil Membrane Required
20 year	√(2)	√	√	VersiFlex PVC 60-mil OR VersiFlex KEE HP PVC 50 mil (3)	Not Available - 80-mil Membrane Required
25 year (5)	√	√	N/A	VersiFlex PVC 80-mil OR VersiFlex KEE HP PVC 60-mil (1)(3)	Available – See Below
30 year (5)	√	√	N/A	VersiFlex PVC/KEE HP PVC 80-mil (1)(3)	Available – See Below

Notes: N/A = Not Acceptable √ = Acceptable

- (1) Sure-Flex PVC/KEE HP PVC 60- or 80-mil membranes in Slate Gray are limited to Warranties Up to 20 Year.
- (2) HydroBond Adhesive may be used for projects with 20 year maximum warranty and wind speed coverage up to 90 mph.
- (3) VersiFlex FRS membrane can be used in lieu of VersiFlex Polyester reinforced membrane for Adhered Roofing Systems Only.
- (4) All “T-Joints” must be overlaid with appropriate flashing material when using 80-mil membrane.
- (5) Enhancements may be required for certain flashing details. Published details must be referenced for applicable requirements.

<p><b>VersiFlex PVC/KEE HP PVC Membrane</b></p> <p><b>Hail</b></p> <ul style="list-style-type: none"> <li>-1" Dia. Hail Coverage requires a minimum of 60-mil VersiFlex PVC/KEE HP PVC Adhered to cover board.</li> <li>-2" Dia. Hail Coverage requires 80-mil VersiFlex PVC/KEE HP PVC Adhered to cover board.</li> </ul> <p>Additional Design Requirement:</p> <ul style="list-style-type: none"> <li>-Cover board (SecurShield HD, SecurShield HD Plus, SecurShield HD or DuraFaceR Composite, DensDeck Prime, or Securock – Adhered Only).</li> </ul> <p><b>Puncture</b></p> <ul style="list-style-type: none"> <li>-Minimum 60-mil PVC/KEE HP with Polyester Reinforcement.</li> </ul>
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### 1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to the job site in the original, unopened containers labeled with the manufacturer's name, brand name and installation instructions.
- B. Store VersiFlex membrane on provided pallets in original undisturbed plastic wrap.
- C. Job site storage temperatures in excess of 90°F may affect shelf life of curable materials (i.e., adhesives and sealants).

- D. When liquid adhesives and sealants are exposed to lower temperatures, restore to a minimum of 60°F before use.
- E. Do not store adhesive containers with opened lids due to loss of solvent, which will occur from flash off.

### **1.07 JOB CONDITIONS**

- A. Refer to Versico Technical Manual for applicable project specific Job Conditions.

## **PART II PRODUCTS**

### **2.01 GENERAL**

The components of this roofing system are to be products of Versico or accepted by Versico as compatible. The installation, performance or integrity of products by others, **when selected by the specifier and accepted by Versico**, is not the responsibility of Versico and is **expressly disclaimed** by the Versico Warranty.

### **2.02 MEMBRANE**

VersiFlex (white, gray, light gray, slate gray and tan) 50-mil (100' long), 60-mil (80' long) or 80-mil (65' long) reinforced Polyvinyl Chloride (PVC) membrane OR VersiFlex KEE HP (white, gray, light gray, slate gray and tan) 50-mil (100' long), 60-mil (80' long) or 80-mil (65' long) polyester reinforced membranes are used for this system. Membrane sheets are 10' and 81" wide. For physical properties of the membrane, refer to Thermoplastic Specification.

### **2.03 RELATED MATERIALS**

Versico Flexible DASH Adhesive, Hydrobond Adhesive, VersiFlex Non-Reinforced Flashing, Reinforced Cover Strips, Cut Edge Sealant, Water Cut-Off Mastic, PVC and KEE HP Membrane Cleaner, One-Part Pourable Sealer, Heat Weldable Walkway Pads, Pre-Molded Inside/Outside Corners, Pipe Flashings, LIQUISEAL Liquid Flashing and Sealant Pockets.

## **PART III EXECUTION**

### **3.01 GENERAL**

- A. When feasible, begin the application at the highest point of the highest roof level and work to the lowest point to prevent moisture infiltration and to minimize construction traffic on completed sections. This will include completion of all flashings, terminations and daily seals.
- B. Follow criteria outlined in the VersiFlex Specification to prepare the roof deck or the existing substrate prior to application of the new roofing system.

### **3.02 ROOF DECK CRITERIA**

- A. The proper substrate shall be provided by the building owner. The structure shall be sufficient to withstand normal construction loads and live loads.
- B. Defects in the roof deck must be reported and documented to the specifier, general contractor and building owner for assessment. The Versico Authorized Contractor shall not proceed with installation unless the defects are corrected.
- C. Refer to Versico Technical Manual for acceptable decks and the applicable Versico Fasteners (when mechanical attachment of insulation is specified).

### **3.03 SUBSTRATE PREPARATION**

- A. On retrofit-recover projects, cut and remove wet insulation, as identified by the specifier, and fill all voids with new insulation so it is relatively flush with the existing surface.
- B. For all projects, substrate must be even without noticeable high spots or depressions, and must be free of accumulated water, ice or snow.
- C. Clear the substrate of debris and foreign material. Fresh bitumen based roof cement must be removed or concealed.

### **3.04 INSTALLATION**

Refer to the applicable Safety Data Sheets and Technical Data Bulletins for cautions and warnings.

#### **A. Insulation Attachment**

1. Versico Flexible DASH Adhesive may be specified for insulation securement in full spray or beads with spacing as outlined in the

Versico Technical Manual.

2. Versico Fasteners may be used, when specified, to secure Versico Insulation at the specified density outlined in the Versico Technical Manual.

#### **B. Membrane Installation and Heat Welding**

1. Sweep loose debris from the substrate.
2. Position VersiFlex Membrane over acceptable substrate and fold membrane back so half the underside is exposed.
3. For VersiFlex PVC, apply membrane bonding adhesive as follows:
  - a. Apply Sure-Flex Low VOC Bonding Adhesive to the exposed underside of the membrane and the corresponding substrate area with a plastic core medium nap paint roller at the appropriate coverage rate. Allow adhesive to flash-off and roll coated membrane into coated substrate. Avoid wrinkling.
  - b. Apply Hydrobond Water-Based Adhesive to the exposed substrate with a roller or airless sprayer at the appropriate coverage rate. HydroBond is designed as a one-sided, "wet" lay-in adhesive with no flash-off time and the adhesive must not dry during the application process. Once the adhesive is applied, roll the membrane in place. Avoid wrinkling.
  - c. Apply CAV-GRIP PVC Aerosol Contact Adhesive to the exposed substrate area with supplied spray gun at the appropriate coverage rate. Allow to flash-off and roll membrane into coated substrate. Avoid wrinkling Versico PVC Bonding Adhesive, Aqua Base 120 Bonding Adhesive or Hydrobond Adhesive to the exposed underside of the membrane and the corresponding substrate area with a plastic core medium nap paint roller at the appropriate coverage rate.
4. For VersiFlex KEE HP PVC, apply Low-VOC PVC Bonding Adhesive to the exposed underside of the membrane and the corresponding substrate area with a plastic core medium nap paint roller at the appropriate coverage rate. Allow adhesive to flash-off and roll coated membrane into coated substrate. Avoid wrinkling.
5. Brush down the bonded section of membrane immediately with a soft bristle push broom.
6. Fold back the unbonded half of the sheet and repeat the bonding procedure.
7. Install adjoining membrane sheets in the same manner, overlapping edges a minimum of 2 inches to provide for a minimum 1-1/2" hot air weld. It is recommended that all splices be shingled to avoid bucking of water.
8. Heat weld the membrane sheets a minimum of 1-1/2" with an Automatic Heat Welding Machine.

#### **C. Additional Membrane Securement**

The membrane must be secured at the perimeter of each roof level, roof section, expansion joint, curb, skylight, interior wall, penthouse, etc., at any angle change which exceeds 2" per horizontal foot and at all other penetrations in accordance with Versico's published details.

#### **D. Membrane Flashing**

Flash all walls and curbs with VersiFlex PVC/KEE HP reinforced membrane. Non-Reinforced membrane shall be limited to inside and outside corners, field fabricated pipe seals, scuppers and Sealant Pockets where the use of pre-molded accessories are not practical. Terminate the flashing in accordance with an appropriate Versico Termination Detail.

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Versico  
P.O. Box 1289, Carlisle, PA 17013  
800-479-6832  
[www.versico.com](http://www.versico.com)

**Physical properties of VersiFlex Membrane can be referenced in Part II, "Products" of the Thermoplastic Specification.  
Attach copies of the applicable Versico Details that pertain to the individual project to complete a bid package submittal.**



# VersiFlex™ FRS PVC Membrane

(All material minimum thickness)



## Overview

Versico's VersiFlex FRS PVC is an advanced-formula, heat-weldable PVC membrane used exclusively in fully adhered applications that utilize liquid-applied bonding adhesives. Designed to provide long-term weatherability and performance, thick PVC-based top and bottom plies encapsulate the membrane's internal fiberglass reinforcement, enhancing dimensional stability. The membrane's smooth surface facilitates a permanent weld for a consistent, watertight, monolithic roof assembly. All FRS PVC membranes are manufactured to exceed minimum thickness specifications.

## Features and Benefits

- Manufactured to exceed minimum thickness specifications
- Available in white, gray, and tan in a variety of thicknesses
- Excellent chemical resistance
- Exceptional heat weldability and low-temperature flexibility
- Resistant to punctures, UV, ozone, and oxidation
- Impact Resistance – UL-2218 Class 4 Rating
- Simple installation process
- Reflective FRS PVC can help reduce cooling and air conditioning costs

## Installation

With minimal labor and few components required, VersiFlex FRS PVC is quick and easy to install.

### Fully Adhered Roofing System

The fully adhered system starts with a suitable surface upon which the CAV-GRIP® PVC, VersiFlex PVC Low-VOC Bonding Adhesive, or HydroBond™ Water-Based PVC Bonding Adhesive will be applied.

REVIEW CURRENT VERSICO SPECIFICATIONS AND DETAILS FOR SPECIFIC INSTALLATION REQUIREMENTS.

## Precautions

- Sunglasses that filter out ultraviolet light are strongly recommended when working on reflective membranes. Roofing technicians should dress appropriately and wear sunscreen to protect skin from the sun.
- Smooth surfaces become slippery due to frost and ice build up. Exercise caution during cold conditions to prevent falls.
- Care must be exercised when working close to a roof edge when surrounding area is snow-covered as the roof edge may not be clearly visible.
- Use proper stacking procedures to ensure sufficient stability of the materials.
- Exercise caution when walking on wet membrane. Membranes may be slippery when wet.
- Store FRS PVC membrane in its original, undisturbed plastic wrap in a cool, shaded area and cover with light-colored, breathable, waterproof tarpaulins. FRS PVC membrane that has been exposed to the weather or contaminated with dirt must be prepared with PVC Membrane Cleaner prior to hot-air welding.

## Supplemental Approvals, Statements and Characteristics

1. VersiFlex FRS PVC membrane meets or exceeds the requirements of ASTM D4434 Standard Specification for Poly (Vinyl Chloride) Sheet Roofing. VersiFlex FRS PVC membrane is classified as type II as defined by ASTM D4434.
2. VersiFlex FRS PVC membrane was tested for dynamic puncture resistance per ASTM D5635 using the most recently modified impact head. 50-mil membrane was watertight after an impact energy of 10.0 J (14.75 ft-lbf) which passes the ASTM D4434 requirement.
3. VersiFlex FRS PVC membrane was tested for static puncture resistance per ASTM D5602 and exceeded 33 lbf (145 N) which passes the ASTM D4434 requirement.

# VersiFlex FRS PVC Membrane

(All material minimum thickness)

## Typical Properties and Characteristics

Physical Property	ASTM D4434 Requirement	60-mil Minimum	80-mil Minimum
Thickness over scrim, in. (mm) ASTM D7635	0.016 (0.40) minimum	0.034 (0.86)	0.040 (1.02)
Weight, lbs/ft <sup>2</sup> (kg/m <sup>2</sup> )	No Requirement	0.44 (2.15)	0.54 (2.63)
Breaking Strength lbf/in (kN/m), MD x CD, ASTM D751 Proc A	55 (10) minimum	80 x 85 (14 x 15)	80 x 85 (14 x 15)
Elongation at break percentage, MD x CD, ASTM D751 Proc A	250 x 220 minimum	310 x 250	380 x 290
Tear Resistance lbf (N), MD x CD, ASTM D1004	10 (45) minimum	20 x 20 (88 x 88)	25 x 25 (111 x 111)
Low Temperature Bend, no cracks 5x at -40°C, ASTM D2136	-40°C	PASS	PASS
Linear Dimensional Change, percentage ASTM D1204, 6 hours at 176°F	0.1 maximum	0.05 x 0.05	0.06 x 0.05
Ozone Resistance, no cracks 7x, ASTM D1149, 168 hours at 100pphm	PASS	PASS	PASS
Water Absorption Resistance, mass percentage, ASTM D570, 166 hours at 158°F water	± 3.0 maximum	PASS	PASS
Puncture Resistance – Dynamic, J (ft-lbf), ASTM D5602	10 (7.4)	PASS	PASS
Puncture Resistance – Static, lbf (N), ASTM D5602	33 (145)	PASS	PASS
Xenon-Arc Resistance, no cracks/crazing 10x, ASTM G155, 0.35 W/m <sup>2</sup> at 340-nm & 63°C B.P.T. 12,600 kJ/m <sup>2</sup> total radiant exposure 10,000 hours	PASS	PASS	PASS
Properties After Heat Aging ASTM D3045, 56 days at 176°F Breaking strength, percent retained Elongation, percent retained	90 min. 90 min.	PASS	PASS

Typical properties and characteristics are based on samples tested and are not guaranteed for all samples of this product. This data and information is intended as a guide and does not reflect the specification range for any particular property of this product.

## Radiative Properties for Cool Roof Rating Council (CRRC) and LEED®

Physical Property	Test Method	White PVC	Tan PVC	Gray PVC	Lt Gray PVC
CRRC - Initial Solar Reflectance	ASTM C1549	0.87	0.72	0.59	0.74
CRRC - Solar Reflectance after 3 years	ASTM C1549 (uncleaned)	0.70	0.56	0.49	0.64*
CRRC - Initial Thermal Emittance	ASTM C1371	0.89	0.87	0.89	0.88
CRRC - Thermal Emittance after 3 years	ASTM C1371 (uncleaned)	0.88	0.87	0.89	0.89*
Solar Reflective Index (SRI) Initial	ASTM E1980	110	88	70	91
Solar Reflective Index (SRI) SRI after 3 years	ASTM E1980	85	66	57	77*

\* Rapid Ratings

## LEED Information

Pre-consumer Recycled Content	10%
Post-consumer Recycled Content	0%
Manufacturing Location	Greenville, IL
Solar Reflectance Index (SRI), Initial	White: 108, Tan: 89, Gray: 69



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# TPO AND PVC T-TOP AND SQUARE TOP VENTS



## Overview

Available in TPO and PVC versions, Versico's T-Top and Square Top Vents are designed to allow air to flow freely through the vent while preventing water from infiltrating the roofing system.

VersiWeld® TPO T-Top and Square Top Vents are constructed using 60-mil (1.5 mm) TPO Detail Membrane, which provides enhanced flexibility and allows for the elimination of T-Joint Covers at three-way membrane intersections.

VersiFlex™ PVC T-Top and Square Top Vents are constructed using 60-mil (1.5 mm) KEE HP Membrane, which provides excellent long-term weathering protection.

TPO and PVC T-Top Vents are white in color and are manufactured in standard sizes of 4", 6", and 8". Additional sizes and colors are available on a special-order basis.

TPO and PVC Square Top Vents are white in color and are available in a nominal size of 8". Additional colors are offered on a special-order basis. Custom sizes of Square Top Vents are not available.

Versico's TPO and PVC T-Top and Square Top Vents are part of the Certified Fabricated Accessory (CFA) program. CFAs are the only factory-fabricated TPO and PVC accessories that meet the stringent quality tolerances to be included in a Versico warranted roofing system.

## Features and Benefits

- Provides a substantial labor savings compared to field-fabrication
- Flexible TPO Detail Membrane allows for the elimination of T-Joint Covers at three-way membrane intersections
- Provides a more consistent, professional appearance than field-fabrication

## Installation

1. After cutting the appropriate-sized hole through the membrane and substrate, secure the vent sub-base to the deck with proper fasteners.
2. Heat-weld the TPO or PVC base flange to the deck membrane.
3. Once the weld area is completely cool, check all splices for voids and cold-welds with a seam probe. Make any needed repairs.
4. For TPO applications, apply TPO Cut-Edge Sealant to all edges of the vent flanges that are located on the deck.

REVIEW VERSICO SPECIFICATIONS AND DETAILS FOR COMPLETE INSTALLATION INFORMATION.

## T-TOP VENTS TYPICAL PROPERTIES AND CHARACTERISTICS

Physical Property	4" TPO	6" TPO	8" TPO	4" PVC	6" PVC	8" PVC
Product Codes	326869	326882	326883	326868	326880	326881
Weight Per Item	4.1 lbs.	4.9 lbs.	6.1 lbs.	4.1 lbs.	4.9 lbs.	6.1 lbs.
Packaging	1 per box	1 per box	1 per box	1 per box	1 per box	1 per box
Diameter (Actual)	Top: 4.5" Bottom: 6.25"	Top: 6.5" Bottom: 8.25"	Top: 8.5" Bottom: 10.25"	Top: 4.5" Bottom: 6.25"	Top: 6.5" Bottom: 8.25"	Top: 8.5" Bottom: 10.25"
Base Size	Sub-base: 12" x 12" Boot: 18" x 18"	Sub-base: 12" x 12" Boot: 20" x 20"	Sub-base: 15" x 15" Boot: 22" x 22"	Sub-base: 12" x 12" Boot: 18" x 18"	Sub-base: 12" x 12" Boot: 20" x 20"	Sub-base: 15" x 15" Boot: 22" x 22"
Overall Height	10.5"	11.5"	12.5"	10.5"	11.5"	12.5"

Sub-base material: 26 Ga. Galv with .060 Weldable Membrane Flange  
Hood material: 26 Ga. Painted steel with Kynar coating

## SQUARE TOP VENT TYPICAL PROPERTIES AND CHARACTERISTICS

Physical Property	8" TPO	8" PVC
Product Codes	326867	326866
Weight Per Item	3 lbs.	3 lbs.
Packaging	1 per box	1 per box
Height	Riser: 6.375" Overall: 7.5"	Riser: 6.375" Overall: 7.5"
Width	Hood: 10.25" Vent: 7.625"	Hood: 10.25" Vent: 7.625"
Base Size	Sub-base: 14" x 14" Boot: 20" x 20"	Sub-base: 14" x 14" Boot: 20" x 20"

Sub-base material: 26 Ga. Galv with .060 Weldable Membrane Flange  
Hood material: 26 Ga. Painted steel

## NET FREE AREA (SQ. IN.)

	NFA	NFA w/ 1/8" Screen
8" Square Top	50	38
4" T-Top	14	11
6" T-Top	31	23
8" T-Top	53	40

## LEED® INFORMATION

Pre-consumer Recycled Content	0%
Post-consumer Recycled Content	0%
Manufacturing Locations	Mount Prospect, IL Piedmont, SC Woodland, WA
Solar Reflectance Index (SRI)	White: 99

# GUARDIAN

FALL PROTECTION

## RIDGE-IT ANCHOR

### ANCHORAGE CONNECTOR

## FEATURES & BENEFITS

- Highly durable stainless steel and zinc-plated steel
- Easy to install
- Discreet design
- Lightweight and durable
- Ideal for both residential construction and maintenance work
- Designed for permanent use on wpod-framed roofs



### CONNECTION POINT

D-Ring

### MATERIAL

Zinc-Plated Steel & Butyl strips for weatherproofing

### COMPATIBLE

Fits any roof pitch

SHOWN:  
**PART #00500**

SHOWN:  
**PART #00510**



# SPECIFICATIONS

## STANDARDS:

OSHA 1910, OSHA 1926 Subpart M

## WORKER CAPACITY:

130 - 420 lbs.

## NOTES:

- Not repairable
- #00500 & #00510: 8 provided nails

## MATERIALS:

Stainless steel  
Zinc-plated steel  
Butyl

## PERFORMANCE:

- Maximum Users: 1

PART #	DESCRIPTION	SIZE/LENGTH	WEIGHT
00500	Ridge-It Anchor with 1 D-Ring	9 3/4"	0.8 Lbs
00510	Ridge-It Anchor with 2 D-Rings	17 1/2"	1.1 Lbs

# APPLICATIONS



## PERSONAL FALL ARREST:

Ridge-it Anchors may be used in Personal Fall Arrest applications to support:

- MAXIMUM 1 Personal Fall Arrest System (PFAS). Structure must withstand loads applied in the directions permitted by the system of at least 5,000 lbs.
- Maximum free fall is 6', or up to 12' if used in combination with equipment explicitly certified for such use.
- Applicable D-rings: Dorsal



## RESTRAINT:

Ridge-it Anchors may be used in Restraint applications. Restraint systems:

- Prevent workers from reaching the leading edge of a fall hazard.
- Always account for fully deployed length of lanyard / SRL.
- Structure must withstand loads applied in the directions permitted by the system of at least 1,000 lbs.
- No free fall is permitted.
- Restraint systems may only be used on surfaces with slopes up to 4/12 (vertical/horizontal).
- Applicable D-rings: Dorsal, Chest, Side, Shoulder.



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# System Specifications

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## FULLY ADHERED PVC & PVC KEE HP SYSTEM

07 54 00/MU

Revision Date: September 2022

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**PLEASE CONSULT THE MULE-HIDE WEBSITE FOR THE MOST CURRENT INFORMATION AT [WWW.MULEHIDE.COM](http://WWW.MULEHIDE.COM)**

# System Specifications

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## FULLY ADHERED REINFORCED PVC & PVC KEE HP SYSTEM SPECIFICATION

Sept 2022

### PART 1 – GENERAL

#### 1.01 Description

##### A. Scope:

1. Furnish and install a Fully Adhered Mule-Hide Reinforced PVC Roofing Membrane with flashings and accessories necessary to comprise a roofing system.
2. The Mule-Hide Fully Adhered Reinforced PVC Membrane Roof System utilizes a 50-mil (.050 inch), 60-mil (.060 inch) or 80-mil (.080 inch) thick reinforced PVC sheet. The PVC membrane is fully adhered to the substrate with bonding adhesive. Adjoining sheets and end laps are overlapped a minimum of 3 inches and welded with a robotic welder. The field membrane is secured at all changes in plane greater than 2" per foot. Note: All membrane thicknesses listed in this specification are nominal thicknesses.
3. The Mule-Hide Fully Adhered PVC KEE HP Membrane Roof System utilizes a 50-mil (.050 inch), 60-mil (.060 inch) or 80-mil (.080 inch) thick reinforced PVC KEE HP sheet. The PVC KEE HP membrane is fully adhered to the substrate with bonding adhesive. Adjoining sheets and end laps are overlapped a minimum of 3 inches and welded with a robotic welder. The field membrane is secured at all changes in plane greater than 2" per foot. Note: All membrane thicknesses listed in this specification are nominal thicknesses

##### B. Related Work:

The work includes, but is not necessarily limited to the installation of:

1. Vapor Retarder (where specified)
2. Wood Blocking (nailers)
3. Insulation
4. Slip Sheet (where required)
5. Fasteners
6. Roof Membrane
7. Roof Membrane Flashings
8. Metal Flashings
9. Adhesives
10. Sealants
11. Walkways

Note: Mule-Hide recommends adherence to industry standards (SMACNA) for the installation of any metalwork.

##### C. General Design Considerations

1. It is the responsibility of the specifier to review local, state and regional codes to determine their impact on the specified Mule-Hide Roofing System.
2. It is the responsibility of the building owner or his/her designated representative to verify structural load limitation. In addition, a core cut may be taken to verify weight of existing components when the



# System Specifications

FULLY ADHERED PVC & PVC KEE HP

Revised Sept 2022

- roofing system is to be specified on an existing facility.
3. On new construction projects, especially in cold climate regions, moisture generated due to the construction process could adversely impact various components within the roofing assembly if not addressed. Refer to SPRI Advisory Bulletin included in the Design Reference DR-03-11 "Construction Generated Moisture".
  4. Drainage must be evaluated by the specifier in accordance with all applicable codes. Slopes may be provided by tapering the structure or through the use of tapered insulation; a sufficient number of roof drains should also be specified and properly located to allow for positive drainage. Significant ponding that could remain after 48 hours should be eliminated with the addition of auxiliary drains in low areas where ponding is anticipated.
  5. Mule-Hide specifically disclaims responsibility for the design and selection of an adequate drainage system and drain accessories. Selection must be made by the building owner or the owner's design professional.
  6. Small incidental areas of ponded water will not impact the performance of this roofing system; however, in accordance with industry standards, the roofing assembly should be designed to prevent ponding of water on the roof for prolonged periods (longer than 48 hours). Good roofing practice dictates proper drainage to prevent possible excessive live load and, in the event of a roof leak, to minimize potential interior damage to the roofing assembly and to the interior of the building.
  7. The removal of existing wet insulation and membrane must be specified. The specifier shall select an appropriate and compatible material as filler for voids created by removal of old insulation or membrane.
  8. Regardless of the type of membrane or assembly selected, any loose flashings at the perimeter, roof drains and roof penetrations must be removed.

## 1.02 Quality Assurance

- A. The Mule-Hide Reinforced PVC or PVC KEE HP Membrane Roofing System shall be installed by an independent roofing contractor (Mule-Hide Warranty Eligible Applicator) eligible to apply for Mule-Hide "System Warranties" when system warranties are requested.
- B. There shall be no deviations from this specification or the Mule-Hide Products Co. ("Mule-Hide") standard details without prior written approval from Mule-Hide's Technical Department.
- C. Upon completion of the installation according to the terms and conditions stated in this specification and in accordance with the information provided in the Warranty Application and Pre-Job survey form and any additional approvals which might have been given by Mule-Hide, an authorized representative of Mule-Hide may perform an on-site inspection of the roof (commercial projects only) to verify that all installation and material requirements have been met.

**NOTE: Inspections are only conducted on projects where a "System Warranty" is requested. Inspections are not conducted on projects not requiring a Mule-Hide Warranty or when only a "Roofing Membrane Limited Warranty" is requested. The sole purpose of an inspection by a Mule-Hide Representative is not to be a final inspection for the benefit of the building owner/owner's representative. It is for the benefit of Mule-Hide to determine if a System Warranty may be offered for the project.**

- D. Mule-Hide reserves the right to reject any roof system and refuse to issue any warranty on roofs which do not comply with Mule-Hide's specifications or current policies.

## 1.03 Submittals

- A. Prior to the time of bidding, the roofing contractor shall submit to the owner or owner's representative the following items:
  1. Copies of Mule-Hide specifications and published Product Data Sheets.
  2. Samples of each material to be used in the roof system.
  3. Specimen copy of Mule-Hide Products Co., Inc. warranty.

# System Specifications

FULLY ADHERED PVC & PVC KEE HP

Revised Sept 2022

4. Dimensioned shop drawings to include an outline of the roof and appropriate details for flashings and terminations.
5. Certification from insulation, roofing and accessory components manufacturers that all materials supplied comply with identified ASTM and industry standards.
6. Verification that system specifications meet all identified code and insurance requirements including but not limited to the following if required:
  - a. Factory Mutual Research Laboratories  
Norwood, MA
  - b. Underwriters Laboratories  
Northbrook, IL

Note: It is the building owner/owner's representative's responsibility to determine what submittals are required for the project.

- B. Submit to Mule-Hide, prior to the job start, a Heat-Weld System Warranty Application to be reviewed by the Mule-Hide Technical Department to determine the acceptability of the project based on the information provided.
  1. The Heat-Weld System Warranty Application ("Warranty Application") must be completely filled out and should be accompanied with a copy of the written roof specification provided by the building owner/designer (if available). Also included should be any requests for deviations to Mule-Hide's standard published specification and details.
  2. A roof drawing shall be submitted with the Warranty Application indicating all dimensions and locations of all penetrations.

## 1.04 Product Delivery, Storage and Handling

- A. All products delivered to the job site shall be in their original unopened containers or wrappings and clearly labeled with the manufacturer's name, product identification and date of manufacture.
- B. Protect all materials from damage during transit, storage and delivery to the job site. Place all materials on pallets and protect from moisture.
- C. Store all materials in a dry, clean area protected from the elements. All rolls of membrane shall be stored flat on pallets.
- D. All adhesive and caulking shall be stored at temperatures between 60°F and 80°F. Materials exposed to lower temperatures affect the workability and performance of the product. Products shall be restored to the above temperature prior to use.
- E. All flammable materials shall be stored in a cool, dry area away from open flames and sparks. Follow precautions outlined on containers or supplied by the material manufacturer/supplier.
- F. All materials determined to have been damaged (confirmed by Mule-Hide) are to be replaced with new materials.

## 1.05 Job Conditions

- A. This specification shall not be considered applicable without the appropriate additional specifications approved by Mule-Hide if it should be determined that any of the following conditions exist:
  1. The installation of any Mule-Hide Roof System is in a coastal area or high wind zone.
  2. If the Mule-Hide Roof System should exceed the structural load conditions as determined by an

# System Specifications

## FULLY ADHERED PVC & PVC KEE HP

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architect or engineer.

3. When chemical or hazardous materials are discharged onto the Mule-Hide Roof System.
- B. Mule-Hide PVC roofing materials may be installed under certain adverse weather conditions such as high humidity or extreme temperatures, but only after consultation with the Mule-Hide Technical Department as special precautions or procedures may be necessary. The performance of the materials, installation costs and production rates may be affected.
  - C. The General Contractor or the building owner shall be responsible for providing adequate surfaces and structures to receive the insulation, Mule-Hide Roof System and related sheet metal necessary for the successful completion of the project
  - D. Only as much new roofing as can be made watertight shall be installed each day. This includes all flashing work.
  - E. All substrates to receive new insulation, membrane or flashing shall be thoroughly dry and free of contaminants. Should surface moisture occur, the contractor shall provide adequate equipment to dry the substrate prior to application of new materials.
  - F. Prior to and during application, all dirt, debris and dust shall be removed from surfaces to be roofed for both new and reroofing substrates.
  - G. On all projects where the Fully Adhered PVC or PVC KEE HP System is specified, it is the responsibility of the independent roofing contractor to have the owner or owner's representative verify the condition of the deck or substrate and to confirm the roof deck can withstand the additional load
  - H. Precautions shall be taken to prevent wind blow-off or wind damage during the course of the roofing application. This may necessitate additional securement of temporary construction, materials and equipment.
  - I. The contractor shall verify and ensure that all roof drain lines are unblocked before starting work. Any blockages found shall be reported to the owner's representative and Mule-Hide's Technical Department in writing.
  - J. Temporary waterstops shall be installed at the end of each day's work. Temporary waterstops shall be removed at the start of the next day's work and disposed of properly. Waterstops should be compatible with all materials.
  - K. Do not install the Mule-Hide PVC or PVC KEE HP Roofing Membrane in direct contact with any product containing asphalt, coal tar pitch, creosote or penta-based materials. Consult the Mule-Hide Technical Department for special installation requirements.
  - L. Do not allow contaminants such as petroleum, grease, acid, solvents, vegetable or mineral oil, animal oil, animal fat, etc., or direct steam venting to come into direct contact with the Mule-Hide PVC Roofing Membrane. Contact the Mule-Hide Technical Department for recommendations if such conditions exist.
  - M. The contractor shall follow and comply with all safety regulations as recommended by OSHA.
  - N. All work shall be scheduled and executed without exposing interior building areas to the effects of inclement weather. The existing building and its contents shall be protected against all risks.
  - O. Arrange work sequence to avoid use of newly constructed roofing for storage, walking surfaces and equipment movement. Contractor shall provide all necessary protection and barriers to segregate the work areas and prevent damage to adjacent areas. If excessive traffic over newly installed membrane is necessary, contractor shall provide plywood or polyester felt protection to prevent damage. All damaged materials shall be replaced with new materials.

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- P. All existing roofing materials to be removed for construction shall be immediately removed from the construction site to a dumping area authorized to receive such debris. Any hazardous materials such as asbestos or materials containing asbestos fibers shall be removed and disposed of in accordance with applicable City, State and Federal requirements.
- Q. Any unusual or concealed conditions discovered during the course of the work are to be reported immediately in writing to the owner and Mule-Hide's Technical Department. Work is to be halted until the owner has responded with a solution to the problems.
- R. Vapor Retarders
1. Mule-Hide does not require a vapor retarder for the protection of the membrane; however, it should be considered by the specifier for the protection of the roofing assembly (i.e. primarily insulation, underlayment and adhesives). The following criteria should be considered by the specifier:
    - a. Use of a vapor retarder to protect insulation and reduce moisture accumulation within an insulated roofing assembly, should be investigated by the specifier. Consult latest publications by ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.), NRCA (National Roofing Contractors Association), and local building and energy codes for specific information.
    - b. In the generally temperate climate of the United States, during the winter months, water vapor flows upward from a heated, more humid interior toward a colder, drier exterior. Vapor retarders are more commonly required in northern climates than in southern regions, where downward vapor pressure may be expected and the roofing membrane itself becomes the vapor retarder.
    - c. On cold storage/freezer facilities, the perimeter and penetration details must be selected to provide an air seal and prevent outside air from infiltrating and condensing within the roofing assembly.
  2. When a vapor retarder is specified, Mule-Hide F5 Air & Vapor Barrier may be used. Refer to the F5 Air & Vapor Barrier Product Data Sheet for product Installation.
- S. On structural concrete decks, when a vapor retarder is not used, gaps in the deck along the perimeter and around penetrations must be sealed. If tilt-up panels are present, vertical joints between panels must be sealed as well. Sealing these areas will help prevent infiltration of hot humid air and possible moisture contamination resulting from condensation. This is specifically important when adhesive is used to attach the roof insulation.
- T. All local building codes, energy codes and requirements must be followed where applicable. It is the roofing contractor's sole responsibility to determine and ensure that the roofing system selected complies with all local codes and requirements.
- U. Both interior and exterior building areas affected by construction shall be cleaned up and any damaged areas shall be repaired to the owner's satisfaction.
- V. Certain project conditions may require modifications to this specification. Contact the Mule-Hide Technical Department if any of the following conditions exist:
1. Roof heights greater than 100 feet.
  2. Geographical location in a 100 mph or greater wind zone, per the ANSI 100 year mean recurrence interval wind isotach.
  3. Location with Exposure D as determined in ANSI A58.1.

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- W. When using heat-welding equipment, always review the equipment manufacturer’s instructions, precautions and warnings.
- X. Consideration should be given in the project design to problems that can precipitate from the smooth surface characteristic of the Mule-Hide Reinforced PVC or PVC KEE HP membrane.

## 1.06 Warranties

All Mule-Hide warranties are available for commercial projects, term limits range from 10 to 30-years, and subject to enhancements as required such as membrane thicknesses. A Roofing Membrane Limited Warranty for a maximum of 20 years is available for residential projects

### A. Mule-Hide's Roofing Membrane Limited Warranty For Commercial Projects

The Roofing Membrane Limited Warranty ("Warranty") covers only the Mule-Hide EPDM membrane (or portion thereof) determined by Mule-Hide to be defective and resulting in roof leaks. This Warranty does not cover workmanship or other components not supplied by Mule-Hide. Mule-Hide does not perform inspections of the installation before issuing the Roofing Membrane Limited Warranty. A Mule-Hide Warranty Application and the appropriate fee must be submitted to Mule-Hide to obtain this warranty. Proof of purchase may be required.

### B. Mule-Hide's Standard System Warranty

The Standard warranty is an NDL ("No Dollar Limit"), labor and material warranty that covers only the Mule-Hide labeled membrane and accessories that comprise the Mule-Hide Roof System, other components supplied or approved in writing by Mule-Hide and exclusively installed by an independent Mule-Hide Warranty Eligible Contractor. Applicator must submit a Warranty Application and the appropriate fee to Mule-Hide. Standard warranties require inspections by a Mule-Hide representative.

### C. Mule-Hide Premium System Warranty

The Premium warranty is an NDL ("No Dollar Limit"), labor and material warranty that covers only the Mule-Hide labeled membrane, insulation and accessories or components supplied or approved in writing by Mule-Hide and exclusively installed by an independent Mule-Hide Warranty Eligible Contractor. Applicator must submit a Warranty Application and the appropriate fee to Mule-Hide. Premium warranties require inspections by a Mule-Hide representative.

## Warranty Table I

Warranty Term	Adhered Membrane Systems Warranty Options <sup>1</sup>						
	Extended Wind Speed Coverages Available				Mule-Hide Reinforced PVC/PVC KEE Minimum Thickness	Additional Membrane Coverage	
	Standard 55 mph	72, 80, 90 mph	100 mph	110 to 120 mph		Additional Puncture	Hail
10, or 15 year	√ <sup>4</sup>	√ <sup>4</sup>	√	√	50-mil PVC or PVC KEE	See Table II Below	See Table II Below
20 year <sup>3</sup>	√ <sup>4</sup>	√ <sup>4</sup>	√	√	60-mil PVC or PVC KEE <sup>2</sup>	See Table II Below	See Table II Below
25 year <sup>3</sup>	√	√	√	N/A	80-mil PVC or PVC KEE <sup>2</sup>	See Table II Below	See Table II Below
30 year <sup>3</sup>	√	√	√	N/A	80-mil PVC KEE <sup>2</sup>	See Table II Below	See Table II Below

Notes: N/A = Not Acceptable √ = Acceptable

1. Contact Mule-Hide Technical Department for specific requirements.
2. All "T-Joints" must be overlaid with appropriate flashing material when using 60 or 80-mil membrane.
3. Enhancements may be required for certain flashing details. Published details must be referenced for applicable requirements.
4. Aqua Base 120 adhesive may be used for projects with 20 year maximum warranty and wind speed coverage up to 72 mph.

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## Warranty Table II

Hail Coverage options	1" Diameter Hail Coverage requires min 60-mil PVC or PVC KEE adhered to cover board <sup>1</sup>
	2" Diameter Hail Coverage requires min 80-mil PVC or PVC KEE adhered to cover board <sup>1</sup>
Puncture Coverage	Minimum 60-mil membrane, Contact Mule-Hide Technical Department for specific requirements

1. Cover board options: Poly ISO 1-HD, DensDeck Prime, or Securock – Adhered in place only

## Warranty Table III

Insulation/Cover Board & Required Attachment for Assemblies Up to 20 YR Warranty Term					
Peak Gust Wind Speed Warranty <sup>9</sup>	Minimum Membrane Underlayment (Mule- Hide Supplied Only) <sup>9</sup>	Insulation/Underlayment Attachment <sup>9</sup>			Metal Edging
		# of Fasteners per 4' x 8' board size <sup>1</sup>	Adhesive Ribbon Spacing for 4' x 4' size board		
			Field	Perimeter /Corner	
55 MPH	1" (20 psi) Poly ISO 1 or 2	16, 24, 32	12" <sup>4,5</sup>	6" <sup>4</sup>	Mule-Hide Gravel Stop, Skirted Drip Edge, 2-Piece Snap-On Compression, 1-3/4" Fascia Cover <sup>3</sup>
	1-1/2" (20-psi) Poly ISO 1 or 2	12, 18, 24	12" <sup>4,5</sup>	6" <sup>4</sup>	
	2" (20 -psi) Poly ISO 1 or 2	8, 12, 16	12" <sup>4,5</sup>	6" <sup>4</sup>	
72 OR 80 MPH	1/4" Dens-Deck <sup>2</sup>	12, 18, 24	12" <sup>4,6</sup>	6" <sup>4,6</sup>	Mule-Hide Gravel Stop <sup>3</sup> , Skirted Drip Edge <sup>3</sup> , 2-Piece Snap-On Compression <sup>3</sup> , 1-3/4" Fascia Cover <sup>3</sup> EclipsEdge <sup>3</sup>
	1/4" Securock <sup>2</sup>				
	1/2" STRUCTODEK <sup>2</sup>	16, 24, 32	6" <sup>4,6</sup>	6" <sup>4,6</sup>	
	1/2" Poly ISO 1 or 2-HD <sup>2</sup>				
	1-1/2" (20-psi) Poly ISO 1 or 2				
2" (20 -psi) Poly ISO 1 or 2	8, 12, 16	6" <sup>4,5,6</sup>	6" <sup>4,5,6</sup>		
90 MPH (10)	1/2" Dens-Deck (2)	12, 18, 24	6" <sup>6,7,8</sup>	6" <sup>6,7,8</sup>	Mule-Hide Gravel Stop <sup>3</sup> , Skirted Drip Edge <sup>3</sup> , 2-Piece Snap-On Compression <sup>3</sup> , 1-3/4" Fascia Cover <sup>3</sup> EclipsEdge <sup>3</sup>
	1/2" Securock (2)				
	1/2" Poly ISO 1 or 2-HD (2)	24, 32, 32	6" <sup>6,7,8</sup>	6" <sup>6,7,8</sup>	
	1-1/2" Hunter CGF Poly ISO (20 psi)	16, 24, 32	6" <sup>5,6,7,8</sup>	6" <sup>5,6,7,8</sup>	
	2" Hunter CGF Poly ISO (20 psi)	8, 12, 16	6" <sup>5,6,7,8</sup>	6" <sup>5,6,7,8</sup>	
100 MPH (10)	5/8" Dens Deck (2)	16, 24, 32	4"	4"	, Skirted Drip Edge <sup>3</sup> , 2-Piece Snap-On Compression <sup>3</sup> , 1-3/4" Fascia Cover <sup>3</sup> EclipsEdge <sup>3</sup>
	5/8" Securock (2)				
	2" Hunter CGF Poly ISO (20 psi)				
110 MPH (10)	5/8" Dens Deck (2)	16, 24, 32	4"	4"	Skirted Drip Edge <sup>3</sup> , 2-Piece Snap-On Compression <sup>3</sup> , 1-3/4" Fascia Cover <sup>3</sup> EclipsEdge <sup>3</sup>
	5/8" Securock (2)				
120 MPH (10)	5/8" Dens Deck (2)	24, 32, 32	4"	4"	Skirted Drip Edge <sup>3</sup> , 2-Piece Snap-On Compression <sup>3</sup> , 1-3/4" Fascia Cover <sup>3</sup> EclipsEdge <sup>3</sup>
	5/8" Securock (2)				

11. Order of fasteners required are field, perimeter and corners.
12. Cover boards must be installed over a min. 1" thick approved Mule-Hide Insulation.
13. Mule-Hide HDP (#14) or EHD (#15) fasteners are required for attachment to perimeter wood nailers.
14. Gravel Surface BUR - Field @ 6" OC / Perimeter @ 4" OC
15. Steel Decks - Field & Perimeter @ 6" OC Must adhere to top of deck flutes
16. Cementitious Wood Fiber - Field @ 6" OC / Perimeter @ 4" OC
17. Smooth BUR - Field @ 6" OC / Perimeter @ 4" OC
18. Gravel Surface BUR – 4" OC
19. See Design Enhancements for term specific requirements.
20. Requires use of HDP (#14) or EHD (#15) as insulation fasteners

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**Warranty Table IV**

Insulation/Cover Board & Required Attachment for Assemblies with 25 or 30-Year Warranty Term					
Peak Gust Wind Speed Warranty	Minimum Membrane Underlayment	Insulation Attachment			Metal Edging
		# of Fasteners per 4' x 8' board size (6, 7)	Adhesive Ribbon Spacing for 4' x 4' size board		
				Field	Perimeter/Corner
55 MPH	1-1/2" to 2-1/2" (25 psi) Poly ISO 1 or 2	16, 24, 32	6" <sup>2,4</sup>	6" <sup>2,4</sup>	Mule-Hide Gravel Stop, Skirted Drip Edge, 2-Piece Snap-On Compression, 1-3/4" Fascia Cover <sup>3</sup>
	1/2" STRUCTODEK <sup>1</sup>				
	1/4" DensDeck <sup>1</sup>				
	1/4" Securock <sup>1</sup>				
72 or 80 MPH	1-1/2" to 2-1/2" Hunter CGF Poly ISO (25 psi)	16,24, 32	6" <sup>2,4,5</sup>	6" <sup>4,5</sup>	Mule-Hide Gravel Stop <sup>3</sup> , Skirted Drip Edge <sup>3</sup> , 2-Piece Snap-On Compression <sup>3</sup> , 1-3/4" Fascia Cover <sup>3</sup> , EclipsEdge <sup>3</sup>
	1/2" DensDeck <sup>1</sup>				
	1/2" Securock <sup>1</sup>				
90 or 100 MPH	1/2" Poly ISO (1 or 2)-HD <sup>1</sup>	16, 24, 32	4"	4"	Skirted Drip Edge <sup>3</sup> , 2-Piece Snap-On Compression <sup>3</sup> , 1-3/4" Fascia Cover <sup>3</sup> , EclipsEdge <sup>3</sup>
	5/8" DensDeck <sup>1</sup>				
	5/8" Securock <sup>1</sup>				

1. Hail coverage offered with substrate.
2. Structural Concrete - Field @ 12" OC / Perimeter @ 6" OC
3. Mule-Hide #14HD or #15EHD fasteners are required for attachment to perimeter wood nailers.
4. Cementitious Wood Fiber & Wood – 4" OC
5. 80-mph over Gypsum Decks – 4" OC
6. Order of fasteners required are field, perimeter and corners.
7. Requires use of HDP (#14) or EDH (#15) as insulation fasteners

- C. Mule-Hide is under no obligation to issue warranties on projects completed prior to submittal of a properly completed Warranty Application to the Mule-Hide Technical Department.
- E. Metal flashing products supplied by Mule-Hide (Mule-Hide Metal Accessories) and installed by a Mule-Hide Warranty Eligible Applicator will be covered under a Standard or Premium System Warranty. The finish on the Mule-Hide labeled metal components are covered for a maximum warranty period for up to 25 years independent of the terms of the issued warranty (see the Mule-Hide 25 Years Limited Metal Warranty for specific warranty coverage).
- F. Standard and Premium System warranties are not available for residential projects.
- G. PVC tie-ins are not covered by Mule-Hide warranties.
- H. Contact Mule-Hide Technical Department for other extended warranties that may be available.
- I. Mule-Hide's obligations under the Roofing Membrane Limited Warranty, the Standard System Warranty, and the Premium System Warranty are limited to the specific terms and conditions of the respective Warranties. Sample copies of the Mule-Hide Warranties are available from Mule-Hide upon request.

## PART 2 - PRODUCTS

### 2.01 General

- A. The components of the Fully Adhered Mule-Hide PVC Membrane Roof System are to be products manufactured or supplied by Mule-Hide Products Co., Inc.

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- B. Components other than those supplied or manufactured by Mule-Hide may be submitted for review and acceptance by Mule-Hide's Technical Department. Mule-Hide's acceptance of any other product is based on chemical compatibility and published performance data provided by the component manufacturer. Other components may be considered on a job-by-job basis and must be approved in writing by Mule-Hide's Technical Department. Mule-Hide offers no warranty or guarantee for the performance or suitability of any component not supplied or manufactured by Mule-Hide.

### 2.02 Roofing Membrane

The Mule-Hide Reinforced PVC Membrane is available 50 mils (.050-inch) thick, 60 mils (.060-inch) thick or 80 mils (.080-inch) thick. The Mule-Hide PVC membrane is a polyester scrim reinforced thermoplastic roofing membrane that meets and exceeds the requirements of ASTM D4434 (Type III or IV) Standard Specification for Poly (Vinyl Chloride) Sheet Roofing. Refer to the Product Data Sheets for physical properties and additional information.

The Mule-Hide PVC KEE HP (High Performance) Membrane is available 50 mils (.050-inch) thick, 60 mils (.060-inch) thick or 80 mils (.080-inch) thick. Mule-Hide PVC KEE HP (High Performance) Membrane is manufactured using DuPont® Elvaloy® resin modifier and provides outstanding thermal stability and flexibility, extended upper and lower temperature performance limits and enhanced chemical resistance. The physical properties of the membrane are enhanced by a tenacious, weft-inserted polyester fabric. Meets or exceeds all requirements of ASTM 4434, Type III and/or Type IV. Refer to the Product Data Sheets for physical properties and additional information.

### 2.03 Accessory Materials

The following Mule-Hide materials must be used to install Mule-Hide Roof Systems. Mule-Hide will not warrant any application where another manufacturer's product is substituted for a Mule-Hide product. **All products listed below are physically and chemically compatible with each other.**

- A. Helix® Max Low-Rise Adhesive, Helix® Max Low-Rise Adhesive 5-Gallon Jug, Helix® Max Low-Rise Adhesive Dual Tank, and Helix® Max Low-Rise Adhesive Dual Cartridge (Helix® Max Low-Rise Adhesive) are a two-component, low-rise, construction grade, polyurethane foam adhesive designed to adhere approved roof insulations, thermal barriers, cover boards and fleece backed single-ply membranes to acceptable substrates. This VOC, CFC, HCFC and solvent free adhesive is quickly and easily applied.
  - 1. Depending on the packaging and delivery option selected, these products can be installed in continuous beads, full spray, or splatter applications. Not all products have the same options so review of the product data sheets is required to ensure proper use.
- B. Helix® Low-Rise Adhesive is a two-component, low-rise, construction grade, polyurethane foam adhesive designed to adhere approved roof insulations, thermal barriers, or cover boards to acceptable substrates, and is available in multiple packaging options: 15 and 50 gallon drums, Dual Tanks, and Dual Cartridges.
- C. HydroBond™ Water-Based PVC Bonding Adhesive – Designed to bond PVC membranes to a clean, dry horizontal surface as a wet lay-in adhesive with slopes up to 2:12. HydroBond can be used with standard PVC, PVC Fleece Back and PVC KEE Fleece Back membranes. HydroBond is not to be used with PVC KEE HP membranes. This product can also be used as a contact adhesive for vertical applications, such as flashings. This water-based adhesive is specially formulated to be in compliance with the state of California Clean Air Act of 1988 (updated in 1997) and as further regulated by California's Air Quality Control Districts listing VOC limitations. This product also meets the requirements of the OTC Model Rule for Single Ply Roofing Adhesive.
- D. Low VOC PVC Bonding Adhesive – A high strength solvent-based contact adhesive that allows bonding of PVC membranes to various porous and non-porous substrates. It is specially formulated using a blend of VOC-exempt and non-exempt solvents to be in compliance with the state of California Clean Air Act of 1988 (updated in 1997) and as further regulated by California's Air Quality Control Districts listing VOC



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limitations. This product also meets the 50 gpl VOC content requirements of the OTC Model Rule for Single Ply Roofing Adhesive.

- E. Mule-Hide PVC Flashing – A non-reinforced, .080-inch thick material primarily used to seal details where field fabrication is necessary, such as drain details, pipe flashings, pitch pocket flashings, seaming joints of the Mule-Hide PVC Coated Metal, and any place where reinforced membrane is not practical.
- F. Mule-Hide PVC Universal Corners – .060-inch thick pre-molded, non-reinforced PVC material. They are uniform in shape and size and provide water tightness at corners formed by PVC Coated Metal and flashing membrane. They provide a neat, finished look to building corners, curbs and parapet flashings with no cutting or stretching required. Universal Corners are available in white only.
- G. Mule-Hide PVC Outside Corners – Are pre-molded and are used for flashing outside corners on a variety of details. Installation is fast and easy with no cutting or stretching required. PVC Outside Corners are available in white, gray, and tan.
- H. Mule-Hide PVC Inside Corners – Are pre-molded and are used for flashing inside corners on a variety of details. Installation is fast and easy with no cutting or stretching required. PVC Inside Corners are available in white, gray, and tan.
- I. Mule-Hide PVC Membrane Cleaner – Used to clean aged PVC and PVC KEE HP membrane prior to the welding process. This cleaner helps to loosen and remove dirt and other contaminants from the surface of the PVC membranes and leaves a suitable surface for welding.
- J. Mule-Hide PVC Pipe Seal – An injection molded, pre-formed flashing for pipes made of Mule-Hide non-reinforced PVC material. They are designed to add ease to the installation process while offering increased watertight security and improved aesthetics. PVC Pipe Seals are designed as an economical flashing for single pipe penetrations on Mule-Hide PVC Membrane roof systems.
- K. PVC Split Pipe Seals – Are fabricated flashings made of 60-mil reinforced PVC membrane for pipes 1-inch to 6-inches in diameter. They are designed to add ease to the installation process while offering increased watertight security and improved aesthetics. The PVC Split Pipe Seals contains a split (cut) and overlap tab that allows the pipe-boot to be opened and wrapped around a round pipe with an obstruction. Such obstructions prevent the use of a standard pre-molded pipe boot.
- L. PVC Square Tubing Wraps – Are fabricated square penetration flashings made of white, gray or tan 60 mil reinforced PVC membrane. Overall height of the flashings is 11 inches. A split (cut) and overlap tab are incorporated into these parts to allow the flashings to be opened and wrapped around a square penetration with an obstruction.
- M. Mule-Hide PVC T-Joint Cover – 60-mil non-reinforced flashing cut into a 4.5" diameter circle used to seal step-offs at splice intersections. Installation is mandatory on all 60-mil and 80-mil PVC systems and on all jobs warranted longer than 15 years.
- N. Mule-Hide PVC Coated Metal – 24-gauge, galvanized steel laminated PVC 35 mils (.035" thick) of Mule-Hide non-reinforced PVC Membrane used for flashing and edge metal.
- O. Mule-Hide Pre-Fabricated Metal Accessories – Skirted metal edge in three basic configurations (standard skirted edge, T-Edge, and T-Edge Plus) provides a fast and installer friendly metal edge detail which saves labor on project installations. These products incorporate either a coated metal face, or a Kynar® coated face, and factory welded integrated skirt. Other items available include; Coated metal scuppers, pourable sealer pans, gutters, and copings.
- P. Mule-Hide All-Purpose Bar ("A-P Bar") – An extruded aluminum bar, 50 mils (.050") thick, used to terminate adhered, reinforced membrane vertical flashings in certain constructions. Mule-Hide A-P Bar may also be used to anchor the field sheet at the base of vertical angle changes.
- Q. Membrane Fasteners and Plates – Mule-Hide offers a variety of membrane fasteners and Plates to meet

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specific job conditions and substrates.

- R. Mule-Hide Thermoplastic One-Part Pourable Sealer – a one-component thermoplastic sealant for use in pitch pockets.
- S. Mule-Hide PVC Cut Edge Sealant – A solvent-based, liquid sealant used to seal the cut edge of the Mule-Hide PVC Membrane.
- T. Mule-Hide PVC Walkway Rolls – An 80 mil non-slip, diamond plate tread pattern of polyester reinforced PVC material that offers excellent tear and puncture resistance. Available in rolls (36" x 60'). Walkway Rolls may be welded directly to the PVC roofing membrane. Walkway Rolls are available in Gray. Mule-Hide specifications require the use of such a product in walkway concentration points (i.e., roof hatches, access doors, rooftop ladders, etc.) regardless of traffic frequency. Walkways must also be installed if regular maintenance (once a month or more) is necessary to service rooftop equipment.
- U. Mule-Hide Insulation – Mule-Hide Poly ISO polyisocyanurate insulation (flat or tapered) is a closed-cell polyisocyanurate foam core laminated to heavy, black (non-asphaltic) glass fiber reinforced felt facers.
- V. Mule-Hide HP Protective Mat – A nominal 6.0-ounce per square yard (140 grams per square meter) UV resistant polypropylene needle punched fabric. It can be used above the membrane as a slipsheet for protection from damage by materials placed on top of the membrane.
- W. F5 Air & Vapor Barrier – A 40-mil thick composite consisting of 35-mil self-adhering rubberized asphalt membrane laminated to a 5-mil UV resistant poly film with an anti-skid surface which is fully compatible with Helix Max Adhesives. A white poly film is available for summer time exposure and a black poly film is available for winter time exposure. F5 Air & Vapor Barrier can also function as a temporary roof for up to 120 days. Available in rolls 39" wide by 75' long (244 square feet).
- X. AeroWeb Low-VOC Aerosol Contact Adhesive/Primer – A low VOC contact adhesive used to prime surfaces prior to the application of F5 Air & Vapor Barrier. It features a quick dry time and ease of application from the self-contained pressurized cylinder.
- Y. AeroWeb PVC Low-VOC Aerosol Contact Adhesive - a low-VOC Aerosol Contact Adhesive that can be used for a variety of applications: adhering PVC bareback membranes to a variety of horizontal substrates and vertical walls, and adhering Fleece Back membranes to vertical surfaces. **AeroWeb PVC cannot be used with any KEE bareback membranes, or HD Wood Fiberboard.**

### 2.04 Related Materials By Others

#### A. Wood Nailers

1. Nailers shall be #2 or better lumber and shall be pressure treated for rot resistance. Creosote and asphaltic preservatives are not acceptable.
2. Wood nailers shall conform to Factory Mutual's Loss Prevention Data Sheet 1-49.
3. Wood nailers shall be installed as specified on the project drawings and shall be of a height sufficient to match the thickness of the insulation being used.

#### B. Insulation

1. Insulation shall be installed as a protection layer over the existing substrate or to obtain a desired thermal value.
2. Insulation shall be compatible with the Mule-Hide PVC membranes, Mule-Hide adhesives, Mule-Hide PVC flashings and other Mule-Hide accessories.

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3. The following insulation boards are acceptable for use with a fully adhered roofing system when a standard warranty is requested:
  - a. Polyisocyanurate insulations having non-asphaltic facers (foil facers are not acceptable) meeting the physical property requirements of Fed. Spec HH-I-1972 and having a minimum compressive resistance of 18 psi. Thickness minimum is 1.0" or greater as required by insulation manufacturer to span steel deck flutes.
  - b. Poly ISO 1-HD is 1/2" thick, 100 psi high density polyisocyanurate insulation board that was specifically designed for use as a cover board. This product consists of a closed-cell polyisocyanurate foam core laminated to premium performance coated glass fiber felt facers.
  - c. High Density Wood Fiberboard - may be used as an overlay over other insulations. 1/2" thick is the minimum requirement when used as an overlay. Mule-Hide requires a minimum 1-inch thick board when installing directly over steel decks. Wood and concrete decks require a minimum 1/2" thick board. Minimum thicknesses and attachment rates will vary with wind requirements and deck types.
  - d. Expanded Polystyrene (EPS). Density of boards must be 1.0 PCF certified minimum and meeting ASTM C578, Type II physical properties. Minimum thickness shall be 1.0 inch. When installing directly over a steel deck the minimum thickness shall be as required by insulation manufacturer to span flutes. An overlay of a minimum 1/2" thick High Density Wood Fiberboard, minimum 1" polyisocyanurate insulation, minimum 1/4" DensDeck, or minimum 1/4" Securock is required. Check local building codes as a layer of gypsum board may be required under the EPS insulation (on steel decks).
  - e. Extruded polystyrene meeting ASTM C578, Types IV, VI or VII physical properties. Minimum thickness shall be 1.0 inch. When installing directly over a steel deck the minimum thickness shall be as required by insulation manufacturer to span flutes. An overlay of a minimum 1/2" thick High Density Wood Fiberboard, minimum 1" polyisocyanurate insulation, minimum 1/4" DensDeck, or minimum 1/4" Securock is required. Check local building codes as a layer of gypsum board may be required under the extruded insulation (on steel decks).
  - f. Perlite Insulation – Perlite is **not** an acceptable top layer insulation. Perlite may only be used as a fill insulation under an approved insulation. The PVC membrane cannot be adhered directly to perlite insulation.
  - g. DensDeck Prime or Securock - A minimum 1/4" thick layer of DensDeck Prime or Securock may be used as an overlay over an approved insulation or as a thermal barrier over a combustible deck.
  - h. State and local building codes should be reviewed regarding the installation of expanded or extruded polystyrene insulation directly over a steel deck.
4. Insulation manufacturer shall provide its recommendations for use and attachment to the owner with a copy sent to Mule-Hide's Warranty Department. In addition, the insulation manufacturer shall provide a copy of their specific warranty conditions.
5. Mule-Hide Premium Warranties require the use of the Mule-Hide labeled insulation or insulation by an approved Mule-Hide manufacturer. Use of other insulations may disqualify the project for consideration of the issuance of a Premium Warranty. Contact the Mule-Hide Technical Department for specific requirements.

### C. UL and FM Approved Assemblies

Contact Mule-Hide Technical Department for proper insulated assemblies when projects require compliance with UL or FM requirements. The components may change with the slope, deck type and classification requested.

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## D. Sheet Metal

1. Metal flashing products supplied by Mule-Hide (Mule-Hide Metal Accessories) and installed by a Mule-Hide Warranty Eligible Contractor will be covered under a Standard or Premium System Warranty.
2. PVC Coated Metal and non-coated metal components such as gravel stops, drip aprons, counterflashings, copings, etc., should be fabricated and installed in accordance ES-1 recommendations and requirements.
3. Sheet metal components supplied by others are not covered by the Mule-Hide warranties. Contact Mule-Hide's Technical Department for specific requirements.

## 2.05 Precautions

- A. Consult Safety Data Sheets and container labels for specific safety instructions prior to use.
- B. Avoid breathing vapors of solvents, cleaners, primers, sealants and adhesives. Use with adequate ventilation. Avoid prolonged contact of solvents, sealants, cleaners, primers and adhesives with skin. Solvent resistant rubber gloves should always be worn during use.
- C. Do not use Mule-Hide PVC roofing products near fire or flame. Do not use open flames for drying of surfaces, sealants or adhesives. **Do not smoke near flammable products.**
- D. Do not use oil-based paint on Mule-Hide's PVC Coated Metal or membrane. Contact Mule-Hide's Technical Department for recommendations.
- E. Do not allow muriatic acid (masonry cleaner) to come in direct contact with the Mule-Hide PVC Membrane or accessory products.
- F. Do not allow Mule-Hide PVC membranes or accessories to come into direct contact with steam or vents that produce temperatures in excess of 140°F.
- G. The Mule-Hide PVC or PVC KEE HP Roof System may be installed in cold weather provided the adhesives are stored at room temperature until just prior to use and used within 2 hours. Adhesives left in the cold must be returned to room temperature prior to use.
- H. Do not apply Helix<sup>®</sup> Max Adhesive when surface and/or ambient temperatures are below 25°F.
- I. In colder temperatures when the ambient temperature is near the dew point, condensation may form on the adhesive as the solvents flash off. If condensation occurs, discontinue the application and allow the surface to dry. **Do not attempt to dry the surface with heat guns or torches.** When weather permits apply a new coat of product.

## PART 3 - EXECUTION

### 3.01 General

- A. When installing a Fully Adhered Mule-Hide Reinforced PVC or PVC KEE HP Membrane Roofing System in cooler weather, it is recommended that liquids such as solvents, sealants, etc., be stored at temperatures between 60°F and 80°F until just prior to use in order to facilitate the installation. Liquid products, if stored outdoors, should be brought up to room temperature prior to use.
- B. When using HydroBond, the adhesive can only be used when temperatures are 40°F and rising, and should not be used when temperatures are expected to fall below 40°F during the 72 hour curing period. HydroBond adhesive cannot be used with PVC KEE HP Membrane.

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- C. Application of the Helix® Max Low-Rise Adhesive shall not proceed during periods of inclement weather. Follow Mule-Hide requirements for application temperatures and humidity levels.
- D. Do not apply Helix® Max Adhesive when surface and/or ambient temperatures are below 25 degrees (F).

### 3.02 Substrate Conditions

The following general conditions apply to the substrate that will receive a Fully Adhered Mule-Hide PVC or PVC KEE HP Membrane Roofing System for both new construction and reroof applications:

- A. The roof deck must be structurally sound to provide proper securement for mechanical fasteners. Areas showing a loss of integrity due to corrosion, rotting, warping, concrete spalling, etc., must be repaired or replaced prior to installing the roofing system.
- B. It is the responsibility of the roofing contractor to perform test cuts at each roof area prior to reroofing. The condition of the substrate must be suitable to receive a Fully Adhered Mule-Hide PVC or PVC KEE HP Roofing System. Wet insulation must be removed and replaced. See Single-Ply Roofing Institute's guidelines for determining wet insulation.
- C. Contact Mule-Hide Technical Department when the substrate is exposed to excessively high humidity and/or a corrosive environment. Special fasteners (e.g. stainless steel) or details may be required.
- D. A determination must be made regarding the presence or absence of coal tar pitch within the existing roof assembly when considering a recover of the old roof system. The presence of coal tar pitch requires the use of a 6-mil poly slipsheet under the new insulation unless the coal tar pitch is 10 years or older and is separated from the Mule-Hide PVC membrane by a layer of insulation a minimum of 1-1/2" thick having a minimum "R" value of 5.0. All joints must be butted tightly together or have joints completely taped to prevent volatiles from damaging roof membrane.
- E. It is acceptable to install a Fully Adhered Mule-Hide PVC or PVC KEE HP Membrane Roofing System over the following deck substrates in new construction, provided that an acceptable insulation or barrier board is installed over the substrate as needed:
  - 1. Structural Metal Deck (22 gauge minimum) shall conform to recommendations outlined in Factory Mutual's Loss Prevention Data Sheet 1-28 (requires insulation). Contact Mule-Hide's Warranty Department for attachment requirements for decks less than 22-gauge in thickness. All FM testing is based on attachment to a 22-gauge steel deck.
  - 2. Structural concrete and pre-cast, pre-stressed concrete (2,500 psi minimum) shall be cured and dry to industry standards and surface shall be smooth and free of moisture or frost. All sharp ridges or other projections above the surface shall be removed before roofing. An approved insulation board is recommended. Minimum deck thickness shall be 2 inches with 3 inches preferred due to possible spalling damage that may occur to the underside of the deck when using fasteners for insulation and membrane attachment. Insulation may be attached with Type III or IV hot asphalt, approved adhesive or approved fasteners. The membrane may be adhered directly to structural concrete decks that have been trowel finished and are completely cured (28 day minimum). Gaps in the deck along the perimeter and around penetrations must be sealed along with vertical joints between tilt-up panels, if present, to prevent infiltration of hot humid air and possible moisture contamination resulting from condensation
  - 3. Lightweight Insulating Concrete Fill and Metal Form Work (minimum 24 gauge) – the roof deck shall be cured and dry to the deck manufacturer's and/or industry standards and shall be smooth and free of ridges and depressions. All necessary venting as recommended by the roof deck manufacturer shall be accomplished. These decks may be acceptable to receive a Fully Adhered Mule-Hide PVC or PVC KEE HP Membrane Roofing System after pullout tests have been completed and appropriate fasteners have been selected. Attachment must be through the insulating concrete into the steel or concrete deck. Insulation board is required. Vapor barriers may be required when installing

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insulation over new decks.

4. Wood Plank (1" minimum) shall conform to Factory Mutual's requirements for Class 1 impregnated decks (insulation is required). FM approved wood decks are a minimum, nominal 2-inch thick, tongue and groove planks.
5. Plywood (15/32" minimum) shall be exterior grade (minimum CDX grade). A layer of an approved insulation is required for reroof applications. On new construction, while insulation board is recommended, adhering directly to the plywood or Oriented Strand Board ("OSB") deck is acceptable if the decking is secured with screws or back-out resistant fasteners. Decks attached with common or cement coated nails or staples shall be covered with an approved insulation. Check with local building code requirements as adhering a PVC or PVC KEE HP membrane direct to a wood deck may not meet local fire codes.
6. Cementitious Wood Fiber Decks - Certain cementitious wood fiber decks may be acceptable to receive a Fully Adhered Mule-Hide PVC or PVC KEE HP Membrane Roofing System after pullout tests have been completed and appropriate fasteners have been selected. This deck type requires an acceptable insulation
7. Gypsum Deck - shall be cured and dry to manufacturers' and/or industry standards. The surface of the deck shall be smooth and free from ridges and depressions. Certain gypsum concrete decks may be acceptable to receive a Fully Adhered Mule-Hide Membrane Roofing System after pullout tests have been completed and appropriate attachment methods have been selected. This deck type typically requires an acceptable insulation.
8. Oriented Strand Board (OSB) shall be a minimum 7/16" thick. Contact Mule-Hide for acceptable sheet sizes, fastener types and spacing when using OSB as requirements will change with thickness used. Minimum thickness or usage restrictions may change depending on local code requirements. Pullout tests must be performed and submitted to Mule-Hide Technical Department prior to bidding the project.

Helix® Max Substrate Compatibility					
Insulation/Underlayments		Roof Decks		Existing Roofing Materials	
Poly ISO 1 & 2	Yes	Concrete	Yes	Smooth BUR	Yes
StructoDeck High Density	Yes	Cellular Lt.Wt. Concrete	Yes <sup>10</sup>	Gravel BUR	Yes <sup>5</sup>
Expanded Polystyrene (EPS)	Yes <sup>1</sup>	NVS Lt.Wt. Concrete	Yes <sup>10</sup>	Mineral Cap Sheet	Yes
Extruded Polystyrene (XPS)	Yes <sup>2</sup>	Gypsum	Yes	Granular Modified-Bitumen	Yes
New Sprayed Foam	No <sup>8</sup>	Cementitious Wood Fiber	Yes	Smooth Modified-Bitumen	Yes
Scarified SPF	No <sup>8</sup>	Plywood/OSB	Yes	Coal Tar Pitch	Yes <sup>6</sup>
DensDeck	Yes	Painted Steel	Yes	Aluminum-Coated BUR	No <sup>7</sup>
Securock	Yes	Galvanized Steel	Yes <sup>3</sup>	Acrylic-Coated SPF	No <sup>8</sup>
Oriented Strand Board	Yes	Acoustical Steel	Yes <sup>4</sup>	Silicone-Coated SPF	No <sup>8</sup>
Poly ISO 1HD	Yes	Wood Plank	Yes	Unoxidized (Shiny) Asphalt	Yes <sup>9</sup>

1. Standard PVC/PVC KEE (non Fleece Back) membrane cannot be installed directly over EPS and requires a suitable overlayment or cover board.
2. For insulation attachment only, contact Mule-Hide Technical Department for options.
3. For new galvanized steel decks, power-washing is necessary to remove finishing oil residue if present.
4. For acoustical steel decks, fill the flutes with fiberglass or other suitable fill insulation and tack in place with strips of duct tape 3' OC, or other adhesive, prior to spraying the deck with Helix® Max Adhesive.
5. A minimum of an approved cover board or insulation is required over properly prepared gravel BUR.
6. An insulation providing the necessary R-value must be specified to prevent the coal tar pitch from softening.
7. Aluminum coatings must be removed by power-washing or by physical abrasion prior to the application of Helix Max Adhesive. Adhesion tests are required to confirm sufficient preparation of the substrate.
8. SPF roofing assemblies may be considered on a job by job basis, contact Mule Hide Technical Department prior to bidding.
- 9.
10. Requires AeroWeb primer for all applications.

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11. Cellular or air-entrained lightweight substrates are acceptable. Lightweight concrete containing expanded aggregate such as perlite or vermiculite is not acceptable. New lightweight concrete must be confirmed by the contractor to be thoroughly dry. Existing substrates will require adhesion tests.
  - F. For reroofing projects having plywood decks, a minimum of one layer of an approved insulation is required after the tear-off has been completed.
  - G. Mule-Hide recommends that all roof surfaces have a positive slope to provide adequate drainage. There should not be any ponding water 48 hours after a rainfall.

### 3.03 Preparation of Existing Substrate

#### A. General

1. To prevent delays or interruptions, coordinate work with other trades or suppliers to ensure that components to be incorporated into the Fully Adhered Mule-Hide PVC Membrane Roofing System are available as the work progresses. Examine substrates to which the roofing materials are to be applied to ensure that their condition is satisfactory for the Mule-Hide PVC or PVC KEE HP Roofing System application.
2. Do not permit voids greater than 1/4" width in the substrate. Concrete substrates shall be cured and free of laitance and curing compounds. Substrates for roofing materials shall be dry and free of oil, dirt, grease, sharp edges and debris. Inspect substrates and correct defects before application of roofing membrane.
3. Specifier or roofing contractor shall determine the condition of the existing roof deck and roofing system. Areas with deteriorated decking, wet insulation or other failed materials shall have those affected materials removed and replaced. Make sure all decking is securely fastened. The roofing contractor has the final responsibility to ensure an acceptable deck is provided to receive the new roof system.
4. Large blisters shall be cut and patched to provide a reasonably level surface.
5. On recover projects, tear off all existing base flashings, cant strips and projection flashings down to the substrate. The flashing substrate shall be dry and free of oil, dirt, grease, sharp edges and debris.
6. Gravel over existing nailers must be totally removed prior to installing new nailers and flashings. Verify that the existing nailers are in good condition and securely anchored to the roof decks.
7. When an additional thickness of insulation is being added, new nailers must be added over existing nailers to match the height of the new insulation. Nailers must be securely anchored to the roof deck per Section 3.05 of this specification.
8. All roof surfaces shall be free of ponded water, ice, or snow. Significant ponding that remains after a period of 48 hours should be eliminated by either installing tapered insulation to create positive drainage of the roof surface or by installing new drains in the low areas where the ponding remains. Positive drainage shall also eliminate the possibility of excessive live loads caused by ponding water that could cause structural damage or failure.
9. When removing an existing roof during reroofing, remove only that amount of roofing and flashing that can be made watertight with new Mule-Hide PVC materials in a one-day period or prior to the onset of inclement weather.
10. Recovering over a gravel surfaced BUR system requires the installation of an acceptable insulation. Loose gravel must be removed prior to mechanically attaching a new layer of insulation. All lead pipe and drain flashings shall be removed. As an alternative to mechanical attachment, Helix® Max Low-Rise Adhesive may be used to adhere approved insulations to properly prepared gravel surfaced

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BUR. Contact Mule-Hide Technical Department for specific information regarding the use of the Helix® Max Low-Rise Adhesive.

11. Recovering over a smooth surfaced BUR and smooth modified bitumen roofing systems shall require the installation of an acceptable insulation. All lead pipe and drain flashings shall be removed. Single-ply membranes such as EPDM, Hypalon, PVC or CPA must have all existing flashings removed, the field sheet must be cut up into sections no larger than 10' by 10' and an acceptable layer of insulation shall be mechanically attached over the existing field membrane. As an alternative to mechanical attachment, Helix® Max Low-Rise Adhesive may be used to adhere approved insulations to properly prepared smooth surfaced existing roof surfaces. Contact Mule-Hide Technical Department for specific information regarding the use of the Helix® Max Low-Rise Adhesive over specific roof types.
12. Polyurethane foam roofing systems ("PUF") are not acceptable for recover applications. The PUF system must be completely removed and new insulation installed prior to the installation of the new PVC Roofing System.
13. If a Mule-Hide Premium System Warranty is requested, the existing roof system **must be removed to the deck** prior to the installation of the new roofing system or a moisture survey by an independent third party must be taken, all wet areas removed and a copy of the survey submitted to Mule-Hide with the warranty application. In no event shall the Mule-Hide Premium System warranty cover the existing roof system or problems created by the existing roof system.

### 3.04 Vapor Retarder Installation (where specified)

- A. Specific climatic and job conditions may require the use of a vapor retarder. It is the sole responsibility of the design professional to determine the need for a vapor retarder (which may be required by local building or energy codes) and its type and location in the roofing system. A vapor retarder may often act as an "air barrier" which may have a positive effect in reducing internal air pressure. Vapor retarders should be strongly considered for buildings subject to high internal air pressures such as airplane hangars and buildings with many loading bays such as warehouse facilities.
- B. The National Roofing Contractors Association recommends the installation of vapor retarders when interior relative humidity is 45% or greater and the outside mean average January temperature is below 40°F.
- C. Install a vapor retarder over a suitable substrate with all side and end laps and all penetrations sealed in accordance with the manufacturer's instructions. The vapor retarder may be loosely laid or adhered with the manufacturer's recommended adhesive.
- D. In reroofing where the existing built-up roof is to remain, the built-up roof may be an adequate vapor retarder as long as all splits or tears are repaired in order to provide a total barrier to vapor penetration.
- E. Projects utilizing Mule-Hide's F5 Air & Vapor Barrier must follow Mule-Hide's installation instructions and details for the F5 Air & Vapor Barrier.

### 3.05 Wood Nailers

- A. Wood nailers are required at all roof perimeter edges where metal edging and gutter systems are specified or where indicated in Mule-Hide's published Standard PVC Details
- B. Nailers shall be firmly anchored to the decks at a maximum 2'-0" OC and shall resist a pullout force of 200 lbs. /linear foot in any direction. A 1/2" vent space shall be provided between adjacent lengths of nailers. Fasteners shall be installed within 6 inches of each end. Spacing and fastener embedment shall conform to Factory Mutual Loss Prevention Data Sheet 1-49.
- C. Height of nailers shall match the surface level of the insulation and roof membrane. The width of the wood nailer shall extend beyond the metal flange to prevent damage to the membrane.



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- D. All woodwork to be reused shall resist a minimum force of 200-lbs. /linear foot in any direction and shall be free of rot.
- E. Wood nailers with creosote and asphaltic preservatives are not acceptable. Pressure treated lumber is not required on new construction unless specified by the architect

## 3.06 Insulation Installation

### A. General

1. Mule-Hide accepted roof insulations shall be installed in accordance with Mule-Hide specifications.
2. Mule-Hide accepted roof insulations shall be secured to the roof deck in accordance with Mule-Hide's requirements.
3. All roof insulation shall be neatly cut to fit around all penetrations and projections with a maximum allowable gap of 1/4-inch.
4. Open joints shall be repaired with like insulation material.
5. Insulation shall be feathered or tapered to provide a minimum sump area of 36" x 36" where possible at all drains. Crickets and saddles may be installed beneath the specified insulation where possible. Crickets and saddles made from non-compatible insulations materials must be overlaid with an acceptable insulation or underlayment.
6. Install no more roof insulation in one day than can be covered with the Mule-Hide PVC membrane or when the onset of inclement weather is anticipated.
7. Insulation installed over steel decks shall be checked so that no edges are left unsupported along the flutes. All insulations shall be of sufficient thickness and density to prevent breakage under normal roof construction traffic.
8. When installing insulation, the end joints of each row of insulation shall be offset against the previous row. When more than one layer of insulation is to be used, succeeding layers are to be laid staggered in relation to the previous layer of insulation and all joints shall be offset.
9. When a Mule-Hide Premium System Warranty is requested, only Mule-Hide labeled insulation may be used unless written approval is obtained, prior to job bid, for an alternative insulation.
10. Insulation other than Mule-Hide labeled insulation must be an FM approved insulation and acceptable to Mule-Hide for use under the Mule-Hide Fully Adhered PVC or PVC KEE HP Roofing System. Refer to the insulation manufacturers guidelines for the appropriate type, size and thickness of the insulation needed for use over the respective substrate and under the Mule-Hide PVC Roofing System. Contact Mule-Hide Technical Department prior to bidding the project to determine approved insulations and assemblies.

### B. Mechanical Attachment

1. Insulation fastening density will vary based on insulation type, thickness, and required warranty
2. For code compliance, increased fastening density may be required depending upon project wind speed and wind uplift requirement.
3. Mule-Hide's minimum attachment rates shall be as follows:

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Insulation Type or Overlay	Fasteners per 4' x 8' board		
	Field	Perimeter	Corner
Approved Polyisocyanurate - Min 2" thick (top layer)	8	12	16
Approved Polyisocyanurate - Min 1.5" up to 2" thick	12	18	24
Approved Polyisocyanurate - Min 1.0" up to 1.5" thick	16	24	32
1/2" HD Poly-ISO - Installed over Approved Insulation	16	24	32
HD Fiberboard - Min 1/2" thick- Installed over Approved Insulation	16	24	32
DensDeck Prime or Securock - Min 1/4" thick - Installed over Approved Insulation	12	18	24
OSB - Min 7/16" thick - Installed over Approved Insulation	17	25	32
Approved OSB/Polyisocyanurate Composite - Min 2" thick	17	25	32

Contact Mule-Hide's Technical Department for FM approvals and required attachment rates that are determined by deck type, insulation brand, type and thickness. When using multiple layers of insulation or more than one type of insulation, the number of fasteners required per board is determined by the top layer of insulation.

#### 4. Perimeter Enhancements

To meet increased uplift requirements in the perimeters and corners of each roof area, additional insulation attachment provisions must be installed as follows:

- a. The minimum width of the perimeter and corner areas shall not be less than eight (8) feet.
- b. See Details MHT-UN-108A and MHT-UN-108B
- c. **Perimeters** – insulation attachment to be increased 50% over the field attachment requirements with a maximum of one (1) fastener every one (1) square feet.
- d. **Corners** – insulation attachment to be increased 100% over the field attachment requirements with a maximum of one (1) fastener every one (1) square feet.
- e. For Factory Mutual projects, the width of the roof perimeter and corner areas is defined as the smaller of 0.1 times the building lesser plan dimension or 0.4 times the eave height (mean roof height for slopes greater than 2"/12" slope), except for heights greater than 60 feet. The minimum width of the perimeter and corner areas shall not be less than three (3) feet. Contact Mule-Hide Technical Department for Factory Mutual projects exceeding 60 foot heights.

#### C. Adhesive Attachment

Adhesive attachment substrate preparation

- 1. The surface to which adhesive is to be applied shall be dry, clean and free of fins, protrusions, sharp edges, loose and foreign materials, oil and grease. Depressions greater than 1/4" shall be filled with Helix® Max Adhesive or other approved patching material. All sharp projections shall be removed. Previously unoxidized (shiny) asphalt must be primed with AeroWeb.
- 2. Seal gaps between the wall/penetration and concrete deck with Mule-Hide F5 Air & Vapor Barrier, FROTH-PAK, or other suitable material, to avoid condensation issues and positive pressure from air infiltration.
- 3. Apply Helix® Max Adhesive when the substrate and ambient temperatures are 25°F or above when spraying or extruding with heated or non-heated equipment. Dispense the adhesive

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between 300-800 psi depending on the equipment used. Consult Mule-Hide Technical Department for more details.

### Adhesive installation

1. Apply Helix<sup>®</sup> Max Adhesive to the substrate.
  - a. For fully adhered applications, spray adhesive to obtain full coverage (approx. 1/8" to 1/4" thick after foaming).
  - b. For bead applications, apply adhesive at 4", 6", or 12" on center with a **minimum 1/2" wide wet bead**. For steel decks, bead attachment of Helix<sup>®</sup> Max Adhesive must run parallel with and be on top of the steel deck flutes.

Bead Spacing Requirements*				
Building Height	Perimeter Width	Bead Spacing		
		Field	Perimeter	Corner
0-25'	4 Feet	12" OC	6" OC	6" OC
26'-49'	8 Feet	12" OC	6" OC	6" OC
50'-74'	12 Feet	12" OC	6" OC	6" OC
75'-100'	16 Feet	12" OC	6" OC	6" OC
101' or greater	Contact Mule-Hide Technical Department			

\*Spacing parameters are for 10, or 15-year 55-mph warranties: (Contact the Mule-Hide Technical Department for bead spacing on higher mph warranties or 20 and 30-year warranty projects).

2. Factory Mutual bead spacing guidelines in the perimeter and corner may differ from the table above. Beads at 12" OC are not acceptable at perimeters and corners.
3. Allow adhesive to rise and develop "string/body" (approx. 1.5-2 min.). String time will vary based on environmental conditions like temperature and humidity. Do not allow the adhesive to over-cure (lose tack) prior to setting insulation boards.
4. Place insulation boards (Maximum board size is 4' x 4'. Cover boards such as DensDeck Prime or Securock may be 4' x 8'.) into adhesive after allowing it to rise and develop "string/body".
5. Designate one person to walk boards into place and then roll the boards between 5-7 minutes from the initial adhesive application. Boards may be temporarily weighted or relief-cut where necessary to keep the boards in constant contact with the adhesive until the adhesive cures.
6. At the beginning of the insulation attachment process and periodically throughout the day, check the adhesion of boards to ensure a tight bond is created and maximum contact is achieved.

**CAUTION:** Gaps between horizontal and vertical surfaces of the roof area as well as gaps around penetrations must be sealed to prevent interior warm air from infiltrating and condensing within the roofing assembly. Condensing moisture could weaken bottom insulation facer and eventually result in dislodgement or loose boards when adhesive is used.

**NOTE:** Projects utilizing Mule-Hide's F5 Air & Vapor Barrier must comply with Mule-Hide's installation requirements and published details.

### 3.07 Membrane Installation

General - Unroll Mule-Hide PVC or PVC KEE HP membrane and position without stretching the membrane. Allow the membrane to relax at least 15 minutes when the temperature is above 60°F, or 30 minutes when the temperature is below 60°F, prior to installation. Inspect and remove any damaged membrane.

- A. Membrane should run perpendicular to the direction of steel deck flutes and orientation of wood decks where possible.

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- B. All membrane overlaps shall be installed to facilitate the flow of water. Seams shall be shingled or run parallel to the flow of water. Backwater seams are not permitted.
- C. Lap sheets a minimum of 3 inches to provide space for a continuous, minimum 1-1/2" weld. All welded field seams shall be a minimum of 2 inches wide. End laps shall be overlapped a minimum of 3 inches.
- D. The roofing contractor shall check all welded seams for continuity and integrity using a cotter pin puller or other suitable blunt object. The contractor shall make sample test seams each day prior to welding field seams. The contractor shall, using scrap material, run at least two test seams, each a minimum of 2' long. Each test seam shall be used to determine adequate seam strength and to ensure the equipment has warmed up, is operating properly and proper settings have been determined. This should be done each time the equipment is turned on after a cool down period.
- E. Perimeter - When installing the Mule-Hide Fully Adhered PVC or PVC KEE HP Roofing membrane system, it is not necessary to install half sheets parallel with the perimeter. Full size sheets should be used everywhere practical to minimize the number of field seams. In place of half sheets, additional fasteners are installed in the insulation in the perimeter areas as defined in 3.06.B Perimeter Enhancements. Weld all laps (seams and end laps) continuously with a minimum weld width of 2 inches. All field welds shall be completed with an automatic welder. Perimeter areas shall be determined by one of the following methods:
  - 1. Mule-Hide defines the minimum perimeter area as 8' in from the roof edge along all exterior roof edges.
  - 2. For Factory Mutual insured buildings, follow guidelines in FM's Loss Prevention Data Sheet 1-29. Contact Mule-Hide Technical Department for fastener spacing for compliance with FM 1-60 and 1-90 requirements.

### 3.08 Field Sheet Attachment

#### Adhesive Options for PVC Adhered Systems

Adhesive*	Single Sided (Wet Lay)	Double Sided (Contact)
Low-VOC PVC Bonding Adhesive	No	Yes
HydroBond	Yes	No
Aqua Base 120	No	Yes
AeroWeb Low-VOC Aerosol Contact Adhesive	No	No
AeroWeb PVC Low-VOC Aerosol Contact Adhesive	No	Yes
*Refer to Product Data Sheets for specific installation instructions related to each adhesive option.		

#### A. General

- 1. Position membrane over substrate with minimum 3" overlap at lap seams, and positioned so that laps will shed water. Allow the membrane to relax at least 15 minutes prior to fastening when temperatures are 60°F and above or 30 minutes when temperatures are below 60°F. After membrane has relaxed, fold membrane in half lengthwise exposing the underside of the sheet. Pails of adhesive are often used to weight the back edge of the membrane to hold it in position.  
**CAUTION:** Keep the protective packaging of the Mule-Hide Heat-Weld Membrane intact until ready to use.

#### B. Mule-Hide Low-VOC PVC Bonding Adhesive

- 1. Mix adhesive scraping the sides and bottom of the can (minimum of 5 minutes is required) until adhesive is uniform in color. Consult Product Data Sheet for adhesive instructions.
- 2. Using a plastic core, medium nap roller, apply a smooth even coat of Low-VOC PVC Bonding

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Adhesive to back side of membrane and substrate (no globs or puddles). A nine inch roller will easily fit into a 5-gallon adhesive container. **Do not apply adhesive in area of seam laps.**

3. Coverage rate to be approximately:

120 square feet per gallon for one surface (membrane or substrate only) or  
60 square feet per gallon per finished surface (membrane & substrate)

4. Allow adhesive to dry to a 'tacky' state. Test adhesive by placing a knuckle into it and turning your wrist a one-quarter turn. Adhesive is ready to mate when it is tacky but does not string when knuckle is lifted.
5. Care must be taken to ensure proper drying. Avoid thin areas of adhesive which can result in over drying and improper adhesion.
6. Extended drying times can be expected during cool, overcast, humid, shaded, or late day applications. The adhesive must be dry (but still tacky) before mating surfaces to avoid permanent blisters due to trapped moisture. Repeat this procedure for the second half of the sheet and each successive sheet of membrane on the roof, remembering to shingle all laps.
7. Roll coated membrane onto substrate being careful to not wrinkle the sheet or trap air bubbles. Once membrane is mated to the substrate, thoroughly broom into place with a stiff bristled push broom to ensure proper contact and 100% adhesion. Repeat this procedure for remaining sheets.

### C. Mule-Hide Hydrobond Water Base PVC Bonding Adhesive (not for PVC KEE HP membrane)

1. HydroBond adhesive can only be used when temperatures are 40°F and rising, and should not be used when temperatures are expected to fall below 40°F during the 72 hour curing period.
2. HydroBond can be used with standard PVC, PVC Fleece Back and PVC KEE Fleece Back membranes. It cannot be used with standard PVC KEE HP membrane.
3. Prepare the membrane by positioning the roll. Unroll the membrane completely to achieve the required overlap. Roll up the membrane in preparation for adhesive application. Do not use the 'barn door' method as this may result in long open times allowing the HydroBond to dry. HydroBond is designed as a one-sided, wet lay-in adhesive with no flash-off time and adhesive must not be allowed to dry during the field application process.
4. HydroBond can be applied to the substrate using either an airless spray machine or a medium nap roller. Ensure that adhesive is not applied to the seam area. It is recommended that adhesive is applied no more than 3' to 4' in front of the roll to prevent drying. Drying can occur rapidly in high temperatures. Ensure that adhesive has not dried before the membrane is rolled into place. To ensure a wet lay-in, adjust application technique according to weather conditions. Avoid heavy or light applications of adhesive as the adhesive performance will be affected.
5. Roll the membrane into the wet adhesive coated substrate while avoiding wrinkles. Immediately broom the membrane starting from the center of the sheet and working out to the sides of the sheet using a soft bristle push broom to work out any air bubbles. Immediately after brooming, roll the adhered membrane in two directions using a crisscross pattern using a 75-lb split steel roller. Brooming and rolling of the membrane is required and must occur immediately after the membrane is placed into the wet adhesive.

- D. Do not run any seams through field drains or sumps. Any seams running through drains shall be cut out and target patches (36" x 36") shall be installed

## 3.09 Welding of Lap Areas

### A. General

1. Roofing membrane is to be hot air welded only. Seaming of "membrane to membrane" and "flashing/detail membrane to membrane" shall be by hot air welding only.
2. All surfaces to be welded shall be clean and dry.

### B. Hot Air Welding

1. Machines for hot air welding are available from several different sources. Each manufacturer's instructions for use shall be followed, as well as all local codes regarding electric grounding, supply and other related functions. Since most automatic welding machines require 218 to 230 volts, the use of a portable generator on the roof is recommended for greater flexibility. **Mule-Hide requires the use of automatic welding machines for all field sheet seaming. Hand welding is only acceptable for flashings and those seams where the automatic welder cannot be used.**
2. Hand-held welding equipment is also available to weld membrane. After the preheated nozzle tip is applied in the overlap area and the material starts to soften, immediately follow with a silicone hand roller to press the heated membrane surfaces together with slow, even movements. Keep the roller within 1 inch of the nozzle tip. Angle the hot air tool so that the flowing air faces the roller. Seam strength may be tested when cool. For best results, testing seams 8 hours after hot air welding is recommended.

### C. "T" Joint Covers

1. **For 50-mil membrane and maximum warranty length of 15-years.** Pay special attention to the "T" lap seams formed where three layers of membrane overlap at a seam. To ensure proper seaming of the "T" joints, the top layer of the Heat-Weld Membrane is creased a minimum of one inch into the lower layer of membrane by using a heat gun with a narrow or pencil tip nozzle and a rubber hand roller. By inserting a heat gun nozzle between the layers of the membrane, the membrane will soften and begin to flow allowing it to crease and seal completely after applying pressure with a hand roller to ensure adequate bonding of the softened material. After heat-sealing the "T" joint, Edge Sealant must be applied on all cut edges of reinforced membrane. See Detail MHP-UN-105A.
2. **For membrane thickness greater than 50-mil or warranty length greater than 15-years.** Separate "T" joint patches are required over all "T" joints. See Detail MHP-UN-105B.

### D. Seam Patches at Roof/Wall Transitions

1. Mule-Hide requires the installation of Non-Reinforced PVC Flashing Membrane patches over any seam that transitions from the horizontal to the vertical. These patches are to be constructed with Non-Reinforced PVC Flashing Membrane only and hot air welded. Refer to Mule-Hide Detail MHP-UN-105C.

### E. Daily Welding Equipment Setup

1. The roofing contractor shall make sample test seams each day prior to welding field seams. The contractor shall, using scrap material, run at least two test seams, each a minimum of 2 feet long. Each test seam shall be used to determine adequate seam strength and to ensure the equipment has warmed up, is operating properly and proper settings have been determined. This should be done each time the equipment is turned on after a cool down period.

### F. Quality Control of Seams

1. After seaming, the seams are checked for integrity with a probe. Any openings or "fishmouths" are to

be repaired with a hand-held hot air tool fitted with a narrow nozzle tip and with a roller. Each day the contractor shall attempt to pull apart several sections of welded seams to test the quality of the welds. Should the welds be deficient, a more thorough examination of the work performed must be carried out and necessary repairs made.

### 3.10 Additional Membrane Securement (Base Attachment)

- A. Additional securement of the PVC membrane by mechanical attachment must be provided at the perimeter of each roof level, base of walls, curbs, skylights, expansion joints, tie-ins, interior walls, bottom of valleys and any angle changes that exceed inclines of 2:12 (2" rise in 12") and various penetrations as shown in the Mule-Hide Standard Details. All securement must be either horizontally to the roof deck or vertically to the base of the various penetrations as shown in the Mule-Hide Standard Details.
- B. The mechanical attachment of the membrane may be achieved by the following methods:
  - 1. 2.4" Seam Plate and appropriate fasteners through the membrane
    - a. The 2.4" Seam Plate and appropriate fasteners are placed with the edge of the Seam Plate approximately 1/2" away from the angle change. Seam Plates may be placed either horizontally or vertically depending on the conditions encountered. Refer to the Mule-Hide PVC standard details for proper placement.
  - 2. Mule-Hide All Purpose Bar
    - a. The Mule-Hide All Purpose Bar is a specially extruded aluminum bar that has pre-punched holes 6 inches on center. Bar may be placed either horizontally or vertically depending on the detail followed. Refer to the Mule-Hide PVC Standard Details for the proper placement.
    - b. The maximum spacing of the fasteners shall not exceed 12 inches on center. Adjoining bars should be spaced approximately 1/2 inch to 1 inch apart. All bars must be attached at the ends a maximum of 1 inch from the end of each bar. This may require pre-drilling additional holes. All cut bars shall be deburred.
    - c. The All Purpose Bar must be installed a minimum of 3 inches to a maximum of 6 inches from inside and outside corners.
  - 3. Drip Edge and Gravel Stop
    - a. For drip edges and gravel stops, the metal flange shall extend a minimum of 3 inches onto the wood nailer. The wood nailer must be wider than the metal flange. Approved screw fasteners shall be installed a maximum of 6 inches on center and 1/2" to 3/4" from the inside edge of the metal flange. Ring shank nails spaced a maximum of 4" on center may also be used.
    - b. Mule-Hide Metal Edge is required on 20-year warranted projects. Mule-Hide Skirted Metal Edge incorporates coated metal edge with a factory welded skirt, additional configurations enable the ability to provide a coated edge detail with a Kynar® finish on the vertical face. Refer to Mule-Hide's Metal Edge Details for installation instructions.
  - 4. Drip edges and gravel stops not made out of PVC Coated Metal are not approved.

### 3.11 Flashing Installation

- A. General
  - 2. All membrane flashings are to be installed concurrently with the roof membrane as the job progresses. Temporary flashings are not allowed without prior written approval from the Mule-Hide Technical Department. Should any water penetrate the new roofing because of incomplete flashings, the affected areas shall be removed and replaced at the

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contractor's expense.

2. All surfaces to be fully adhered should be compatible, dry and smooth with no excessive surface roughness. If an existing asphalt surface is present, a minimum ½” thick plywood, 9 oz. polyester felt, acceptable insulation board or 26-gauge minimum galvanized metal barrier must be placed over the asphaltic surface.
3. On recover projects, tear off all existing base flashings, cant strips and projection flashings down to the substrate. If deteriorated areas of substrate are uncovered, repairs must be made to provide a suitable substrate for the new PVC flashings

## Adhesive Options for PVC wall flashings

Adhesive*	Single Sided (Wet Lay)	Double Sided (Contact)
Low-VOC PVC Bonding Adhesive	No	Yes
HydroBond	No	No
Aqua Base 120	No	Yes
AeroWeb Low-VOC Aerosol Contact Adhesive	No	No
AeroWeb PVC Low-VOC Aerosol Contact Adhesive	No	Yes

\*Refer to Product Data Sheets for specific installation instructions related to each adhesive option.

### B. Low-VOC PVC Bonding Adhesive

1. Mix adhesive scraping the sides and bottom of the can (minimum 5 minutes is required) until adhesive is uniform in color. Consult product data sheet for adhesive instructions.
  - a. Low-VOC PVC Bonding Adhesive requires mechanical stirring (electric drill), both initially and periodically during application.
  - b. Porous surfaces and substrates may require the application of a prime coat and second coat of Low-VOC PVC Bonding Adhesive 8 to accomplish proper adhesion
2. Using a plastic core, medium nap roller, apply a smooth even coat of Low-VOC PVC Bonding Adhesive to back side of membrane and substrate (no globs or puddles). A nine inch roller will easily fit into a 5-gallon adhesive container. **Do not apply adhesive in area of seam laps.**
3. Coverage rate to be approximately:
 

120 square feet per gallon for one surface (membrane or substrate only) or  
60 square feet per gallon per finished surface (membrane and substrate)
4. Allow adhesive to dry to a ‘tacky’ state. Test adhesive by placing a knuckle into it and turning your wrist a one-quarter turn. Adhesive is ready to mate when it is tacky but does not string when knuckle is lifted.
5. Care must be taken to ensure proper drying. Avoid thin layers of adhesive which can result in over drying and improper adhesion.
6. Roll coated membrane onto substrate being careful to not wrinkle the sheet or trap air bubbles. Once membrane is mated to the substrate, carefully roll the membrane with a 2-inch wide rubber hand roller to promote maximum positive contact between the membrane and the substrate.
7. PVC Membrane Flashings shall extend a minimum of 6 inches onto the field sheet and be adhered securely. There shall be a minimum of 2 inches between the front of the fastener plates and the edge of the sheet to allow for heat welding. All side laps are to overlap a minimum of 2 inches.
8. **Areas of the flashings and membrane to be welded are not to have bonding adhesive applied to them.**



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9. Extended drying times can be expected during cool, overcast, humid, shaded, or late day applications. The adhesive must be dry (but still tacky) before mating surfaces to avoid permanent blisters due to trapped solvents.
10. All flashings shall be extended a minimum of 8 inches above roof membrane level and be terminated unless previously accepted by the owner or his representative and the Mule-Hide Technical Department. All flashings shall be hot air welded at their connections with the roofing membrane. Apply Cut Edge Sealant at all welded edges of cut membrane flashings. Refer to Mule-Hide PVC Standard Details for more information.

NOTE: After flashing is adhered in place, promote full contact adhesion by going back over entire area with a 2-inch rubber hand roller

- B. PVC Membrane flashings with HydroBond Water-Based Bonding Adhesive (PVC only, not for PVC KEE).
  1. Apply a medium to heavy coat of adhesive to wall, and then apply a standard coat to the membrane flashing. ALLOW ADHESIVE TO DRY THOROUGHLY. Lack of thorough drying will result in poor adhesive strength and/or blistering over time.
  2. Avoiding wrinkles, mate flashing membrane to adhesive coated wall. Immediately broom bonded flashing with a stiff bristle push broom, start at the angle change and roll the membrane flashing up the wall. Using a 3" wide 'J' roller (preferred) roll membrane flashing into place to assure maximum contact. Work up evenly from the base and in small sections, thus ensuring full attachment at the lower sections before moving to the top of the membrane. Temporarily tape or pin the top edge of flashing to the wall to prevent membrane curl-back until the termination detail can be completed.
  3. All flashings shall extend a minimum of 8" above roof membrane level where possible unless previously accepted by the owner or his representative and the Mule-Hide Technical Department.
  4. All flashings shall be hot air welded at their connections with the roofing membrane and other PVC flashings.
  5. Apply PVC Cut Edge Sealant at all welded edges.
  6. All flashings shall be properly terminated according to Mule-Hide's published standard PVC details.

## 3.12 Drains, Expansion Joints, Pitch Pans

### A. Roof Drains

1. Prepare the surface around each drain to prevent any distortion, tenting, or bridging of the membrane. A smooth transition shall be provided from the roof surface to the surface of the drain bowl/clamping ring.
2. All existing roofing materials and metal flashings shall be removed.
3. Mule-Hide requires the application of one full tube of Water Cut-Off Mastic per drain applied to the drain bowl, under the membrane, where the clamping ring will be seated. This will provide a continuous seal between the membrane and the drain bowl.
4. Do not run field seams through drains or sumps. If sheet layout causes a seam to fall in line with a drain, a target patch (minimum 36" x 36") shall be required.

### B. Expansion Joints

1. Refer to Mule-Hide's published standard PVC details for application methods for flashing expansion joints.

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## C. Pitch Pans

1. Install and flash pitch pans as indicated in Mule-Hide's published standard PVC details. All pitch pans shall be filled with Thermoplastic One-Part Pourable Sealer.

### 3.13 Walkway Installation

Walkways must be provided in areas where routine rooftop maintenance occurs and in areas where regular rooftop traffic is expected.

#### A. Mule-Hide PVC Walkway Roll Installation

1. Install PVC Walkway Rolls over clean, dry surfaces.
2. Layout areas where PVC Walkway material is to be installed with most of the material being oriented so that it is placed between field seams in maximum lengths of 30 feet with each adjacent and abutting section gapped a minimum of 6". Do not install walkway pads over seams or flashings.
3. Heat weld the perimeter of the properly positioned PVC Walkway material. Check seams for any voids or inconsistencies that might prevent watertightness.
4. Apply PVC Cut Edge Sealant at all welded edges.

#### B. Precast Pavers

1. Install precast paver systems acceptable to Mule-Hide over one layer of a Polyester Mat Protection Material or other acceptable slip sheet material.
2. A sheet of PVC membrane may be used as a protection layer under the precast pavers.
3. Set precast pavers so that they do not cover field seams.

### 3.14 Temporary Tie-ins

- A. Install temporary cutoffs around incomplete edges of roofing assembly at the end of each day's work and when work must be postponed due to inclement weather. Temporary tie-ins shall be positioned so any sealed membrane edge will not buck or pond water. Ensure drainage is not restricted.
- B. Remove all gravel, dirt, debris or other contaminants from the tie-in area and make sure all surfaces are clean and dry.
- C. All loose membrane edges should be sealed downslope with products compatible with the existing substrate and membrane type being installed. Provide continuous pressure along the sealed edge to prevent water migration under the finished roof sections.
- D. When work resumes, remove the temporary seals completely including contaminated membrane, sealants, insulation fillers, etc. from the work area and properly dispose.

**Note: Mule-Hide does not warrant or guarantee the water tightness of any nightly tie-in. Temporary night seals and their performance are the sole responsibility of the roofing contractor.**

**END OF SECTION**

This specification represents the applicable information available at the time of its publication. Mule-Hide reserves the right to change this information at any time. Contact Mule-Hide Technical Department or check the Mule-Hide website ([www.mulehide.com](http://www.mulehide.com)) for the latest updates regarding changes or modifications to this specification.

**Manufacturer**

Georgia-Pacific Gypsum      Georgia-Pacific Canada  
 133 Peachtree Street      2180 Meadowvale Boulevard, Suite 200  
 Atlanta, GA 30303      Mississauga, ON L5N 5S3  
 Technical Service Hotline: 1-800-225-6119

**Description**

**DensDeck® Prime Roof Board** has been enhanced to provide a broader compatibility and higher performance with roofing adhesives. Face mat enhancements allow adhesives to be applied more uniformly and consistently. In adhered, single ply membrane testing, enhanced DensDeck Prime demonstrated an average of 24% better bond than the original products, when using solvent based adhesives. (Average based on 60 sq.ft./gal coverage rates.)\* Choose DensDeck Prime Roof Boards for adhered and self-adhered “peel & stick” roofing systems, as well as hot mopped, cold mastic and torch-applied modified bitumen roofs. Enhanced DensDeck Prime Roof Boards create a stronger and more economical installation by reducing the amounts of mastic or adhesive used and potentially eliminates the field primer. Consult with membrane manufacturer for actual priming requirements.

DensDeck Prime Roof Boards are the first and only fiberglass mat gypsum roof boards with a 90-day weather exposure limited warranty when applied vertically on a parapet wall. \*\* (Limited to 1/2” and 5/8” products only.)

**Primary Uses**

Roof system manufacturers and designers have found DensDeck Prime Roof Board to be compatible with many types of roofing systems, including: modified asphalt, single-ply, metal systems, recover board, as well as an overlayment for polyisocyanurate and polystyrene insulation. DensDeck Prime Roof Board can also be used as a form board for poured gypsum concrete deck in roof applications as well as a substrate for spray foam roofing systems. 1/2” (12.7 mm) and 5/8” (15.9 mm) DensDeck Prime Roof Board may also be used in vertical applications as a backer board or liner for the roof side of parapet walls.

DensDeck Prime Roof Board may allow the bonding of cold mastic modified bitumen and torching directly to the surface. *Consult with the system manufacturer for recommendations on this application.*

DensDeck Prime Roof Board is the preferred substrate for vapor retarders.

**Standards and Code Approvals**

DensDeck Prime Roof Boards are manufactured to meet ASTM C1177 and have the following approvals:

- Florida Product Approved
- Miami-Dade County Product Control Approved

**Recommendations and Limitations**

DensDeck Prime Roof Boards are manufactured to act with a properly designed roof system following good roofing practices. The actual use of DensDeck Prime Roof Board as a roofing component in any system or assembly is the responsibility of the roofing system’s design authority. Consult with the appropriate system manufacturer and/or design authority for system and assembly specifications and instructions on applying other products to DensDeck Prime Roof Board. Georgia-Pacific does not warrant and is not responsible for any systems or assemblies utilizing DensDeck Prime Roof Board or any component in such systems or assemblies other than DensDeck Prime Roof Board.

The need for a separator sheet between the DensDeck Prime Roof Board and the roofing membrane must be determined by the roof membrane manufacturer or roofing system designer.

\* Testing was done in accordance with FM approvals 4470, Appendix C: Small Scale Tests, Membrane Delamination Tests for Roofing Membranes and Substrates Using Tensile Loading.

\*\* For complete warranty details, visit [www.DensDeck.com](http://www.DensDeck.com). (Limited to 1/2” and 5/8” products only.)

Confirm any priming requirements with the membrane manufacturer. When applying solvent-based adhesives or primers, allow sufficient time for the solvent to flash off to avoid damage to roofing components.

DensDeck Prime Roof Boards should not be subjected to abnormal or excessive loads or foot traffic, such as, but not limited to, use on plaza decks or under steel-wheeled equipment that may fracture or damage the panels. Provide suitable roofing system protection when required.

When using DensDeck Prime Roof Boards for hot-mopped applications, Georgia-Pacific recommends maximum asphalt application temperatures of 425°F (218°C) to 450°F (232°C). Application temperatures above these recommended temperatures may adversely affect roof system performance. Consult and follow the roofing system manufacturer’s specifications for full mopping applications and temperature requirements.

When using DensDeck Prime Roof Board as a substrate for torch applications, ensure that the product is dry and that the proper torching technique is used. Limit the heat to the DensDeck Prime Roof Board. Maintain a majority of the torch flame directly on the roll.

Conditions beyond the control of Georgia-Pacific, such as weather conditions, dew, leaks, application temperatures and techniques may cause adverse effects with roofing systems.

**Handling and Use—CAUTION**

This product contains fiberglass facings which may cause skin irritation. Dust and fibers produced during the handling and installation of the product may cause skin, eye and respiratory tract irritation. Avoid breathing dust and minimize contact with skin and eyes. Wear long sleeve shirts, long pants and eye protection. Always maintain adequate ventilation. Use a dust mask or NIOSH/MSHA approved respirator as appropriate in dusty or poorly ventilated areas.

**Moisture Management**

**DensDeck Prime Roof Boards, like other components used in roofing systems, must be protected from exposure to moisture before, during and after installation.**

Remove the plastic packaging from all DensDeck Prime Roof Board immediately upon receipt of delivery. Failure to remove the plastic packaging may result in entrapment of condensation or moisture. DensDeck Prime Roof Board stored outside must be stored level and off the ground and protected by a breathable waterproof covering. Provide means for air circulation around and under stored bundles of DensDeck Prime Roof Board. DensDeck Prime Roof Board must be covered the same day as installed.

Avoid application of DensDeck Prime Roof Boards during rain, heavy fog and any other conditions that may deposit moisture on the surface, and avoid the overuse of non-vented, direct-fired heaters during winter months. When roofing systems are installed on new poured concrete or light weight concrete decks or when re-roofing over an existing concrete deck, a vapor barrier should be installed above the concrete to retard the migration of water from the concrete into the roof assembly. Always consult the roofing system manufacturer or design authority for specific instructions for applying other products to DensDeck Prime Roof Boards.

Moisture vapor movement by convection must be eliminated, and the flow of water by gravity through imperfections in the roof system must be controlled. After a leak has occurred, no condensation on the upper surface of the system should be tolerated, and the water introduced by the leak must be dissipated to the building interior in a minimum amount of time.

Although DensDeck Prime Roof Boards are engineered with fiberglass facings and high density gypsum cores, the presence of free moisture can have a detrimental effect on the performance of the product and the installation of roofing membranes. For example, hot asphalt applications can blister; torched modified bitumen may not properly bond; and adhesives for single ply membranes may not dry properly.

**Submittal Approvals**

Job Name \_\_\_\_\_

*continued* →

Contractor \_\_\_\_\_

Date \_\_\_\_\_

Moisture accumulation may also significantly decrease wind uplift and vertical pull resistance in the system or assembly. DensDeck<sup>®</sup> Prime Roof Boards containing excessive free moisture content may need to be evaluated for structural stability to assure wind uplift performance.

**Fire Resistance Classifications**

DensDeck Prime Roof Boards are excellent fire barriers over combustible and noncombustible roof decks, including steel decks.

**UL 790 Classification.** DensDeck Prime Roof Boards have been classified by Underwriters Laboratories LLC (UL) for use as a fire barrier over combustible and noncombustible decks in accordance with the ANSI/UL 790 test standard. The UL classification includes a comprehensive Class A, B or C rating. For additional information concerning the UL 790 classification, consult the UL Certification Directory.

**UL 1256 Classification.** DensDeck Prime Roof Boards have also been classified by UL in roof deck constructions for internal (under deck) fire exposure in accordance with the ANSI/UL 1256 Steiner Tunnel test. For additional information concerning the UL 1256 classification, consult the UL Certification Directory.

**FM Class 1 Approvals.** DensDeck Prime Roof Boards are included in numerous roofing assemblies with a Factory Mutual (FM) Class 1 fire rating. 1/4" (6.4 mm) DensDeck Prime Roof Boards have passed testing under the FM Calorimeter Standard 4450

and have been approved by FM as such for insulated steel deck roofs when installed according to the conditions identified by FM. For more information concerning FM Approvals and FM Class 1 assemblies with DensDeck Prime Roof Boards, consult FM or RoofNav<sup>®</sup>.

**Type X.** 5/8" (15.9 mm) DensDeck<sup>®</sup> Prime Fireguard<sup>®</sup> Roof Boards are manufactured to meet the "Type X" requirements of ASTM C1177 for increased fire resistance beyond regular gypsum board.

**UL Fire Resistance Ratings.** 5/8" (15.9 mm) DensDeck Prime Fireguard Roof Boards are designated as **Type DD** by UL and included in assembly designs investigated by UL for hourly fire resistance ratings. 5/8" (15.9 mm) DensDeck Prime Fireguard Roof Boards may also replace any unclassified 5/8" (15.9 mm) gypsum board in an assembly in the UL Fire Resistance Directory under the prefix "P".

**Flame Spread and Smoke Developed.** When tested in accordance with ASTM E84, DensDeck Prime Roof Boards had Flame Spread 0, Smoke Developed 0.

**Wind Uplift**

DensDeck Prime Roof Boards are included in numerous assemblies evaluated by FM or other independent laboratories for wind uplift performance. For information concerning such assemblies, please visit [www.roofnav.com](http://www.roofnav.com).

**Physical Properties**

Properties	1/4" (6.4 mm)	1/2" (12.7mm)	5/8" (15.9 mm)
Thickness, nominal	1/4" (6.4 mm) ± 1/16" (1.6 mm)	1/2" (12.7 mm) ± 1/32" (.8 mm)	5/8" (15.9 mm) ± 1/32" (.8 mm)
Width, standard	4' (1219 mm) ± 1/8" (3 mm)	4' (1219 mm) ± 1/8" (3 mm)	4' (1219 mm) ± 1/8" (3 mm)
Length, standard	4' (1219 mm) and 8' (2438 mm) ± 1/4" (6.4 mm)	4' (1219 mm) and 8' (2438 mm) ± 1/4" (6.4 mm)	4' (1219 mm) and 8' (2438 mm) ± 1/4" (6.4 mm)
Weight, nominal, lbs./sq. ft. (Kg/m <sup>2</sup> )	1.2 (5.9)	2.0 (9.8)	2.5 (12.2)
Surfacing	Fiberglass mat with non-asphaltic coating	Fiberglass mat with non-asphaltic coating	Fiberglass mat with non-asphaltic coating
Flexural Strength <sup>1</sup> , parallel, lbf. min. (N)	≥40 (178)	≥80 (356)	≥100 (444)
Flute Spanability <sup>2</sup>	2-5/8" (66.7 mm)	5" (127 mm)	8" (203 mm)
Permeance <sup>3</sup> , perms (ng/Pa•S•m <sup>2</sup> )	>30 (>1710)	>23 (>1300)	>17 (>970)
R Value <sup>4</sup> , ft <sup>2</sup> •°F•hr/BTU (m <sup>2</sup> •K/W)	.28	.56	.67
Linear Variation with Change in Temp., in/in °F (mm/mm/°C)	8.5 x 10 <sup>-6</sup> (15.3 x 10 <sup>-6</sup> )	8.5 x 10 <sup>-6</sup> (15.3 x 10 <sup>-6</sup> )	8.5 x 10 <sup>-6</sup> (15.3 x 10 <sup>-6</sup> )
Linear Variation with Change in Moisture	6.25 x 10 <sup>-6</sup>	6.25 x 10 <sup>-6</sup>	6.25 x 10 <sup>-6</sup>
Water Absorption <sup>5</sup> , % max	5	5	5
Compressive Strength <sup>6</sup> , psi nominal	900	900	900
Surface Water Absorption, grams, nominal	1.0	1.0	1.0
Flame Spread, Smoke Developed (ASTM E84)	0/0	0/0	0/0
Bending Radius	4' (1219 mm)	6' (1829 mm)	8' (2438 mm)

1. Tested in accordance with ASTM C473 method B.

2. Tested in accordance with ASTM E661.

3. Tested in accordance with ASTM E96 (dry cup method).

4. Tested in accordance with ASTM C518 (heat flow meter).

5. Specified values per ASTM C1177.

6. Tested in accordance with ASTM C473.



U.S.A. Georgia-Pacific Gypsum LLC  
 Georgia-Pacific Gypsum II LLC  
 Canada Georgia-Pacific Canada LP

**SALES INFORMATION AND ORDER PLACEMENT**

U.S.A. West: **1-800-824-7503**  
 Midwest: **1-800-876-4746**  
 South Central: **1-800-231-6060**  
 Southeast: **1-800-327-2344**  
 Northeast: **1-800-947-4497**

CANADA Canada Toll Free: **1-800-387-6823**  
 Quebec Toll Free: **1-800-361-0486**

**TECHNICAL INFORMATION**

U.S.A. and Canada: **1-800-225-6119**, [www.gpgypsum.com](http://www.gpgypsum.com)

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**WARRANTIES, REMEDIES AND TERMS OF SALE** For current warranty information for this product, please go to [www.gpgypsum.com](http://www.gpgypsum.com) and select the product for warranty information. All sales of this product by Georgia-Pacific are subject to our Terms of Sale available at [www.gpgypsum.com](http://www.gpgypsum.com).

**UPDATES AND CURRENT INFORMATION** The information in this document may change without notice. Visit our website at [www.gpgypsum.com](http://www.gpgypsum.com) for updates and current information.

**CAUTION** For product fire, safety and use information, go to [www.buildgp.com/safetyinfo](http://www.buildgp.com/safetyinfo) or call **1-800-225-6119**.

**FIRE SAFETY CAUTION** Passing a fire test in a controlled laboratory setting and/or certifying or labeling a product as having a one-hour, two-hour, or any other fire resistance or protection rating and, therefore, as acceptable for use in certain fire rated assemblies/systems, does not mean that either a particular assembly/system incorporating the product, or any given piece of the product itself, will necessarily provide one-hour fire resistance, two-hour fire resistance, or any other specified fire resistance or protection in an actual fire. In the event of an actual fire, you should immediately take any and all actions necessary for your safety and the safety of others without regard for any fire rating of any product or assembly/system.



# MULE-HIDE PVC MEMBRANE

## PRODUCT DESCRIPTION

Mule-Hide's Sure-Flex PVC is an advanced-formula, heat-weldable PVC thermoplastic membrane that is designed for long-term weatherability and performance. The physical properties of the membrane are enhanced by a tenacious, weft-inserted polyester fabric that is encapsulated by thick PVC-based top and bottom plies. The smooth surface of the PVC membrane allows for a total-surface fusion and permanent weld, creating a consistent, watertight, monolithic roof assembly. PVC can be used in adhered and mechanically fastened systems. The gray-colored bottom ply provides a visual confirmation of a proper weld during the lap welding process.

Revision Date: May 2022



## FEATURES AND BENEFITS

- Wide choice of membrane sizes, thicknesses and colors
- Enhanced chemical resistance
- Energy efficiency
- Wide window of weldability
- Flexibility in low temperatures
- Impact and puncture resistance
- UV, ozone and oxidation resistance
- Easy installation
- Available in white, gray, and tan

## INSTALLATION

With minimal labor and few components required, PVC is quick and easy to install. PVC systems are installed using an Automatic Heat Welder, making sheet welding fast, clean and consistent.

### **Fully Adhered Roofing System**

The fully adhered system starts with a suitable surface upon which the Low-VOC PVC Bonding Adhesive or HydroBond™ Water-Based PVC Bonding Adhesive is applied.

### **Mechanically Fastened Roofing System**

The mechanically fastened system starts with approved insulation being fastened with a minimum of 5 fasteners per 4' x 8' board. The PVC membrane is then mechanically fastened to the deck using HDP Fasteners and 2.4" Plates™, or EHD Fasteners and 2.4" Plates. Adjoining sheets of PVC membrane are overlapped over the fasteners and plates and joined together with a minimum 1½"-wide hot-air weld.

*Review Mule-Hide specifications and details for complete installation information.*

## PRECAUTIONS

- Sunglasses that filter out ultraviolet light are strongly recommended, as the membrane's white surface is highly reflective to sunlight. Roofing technicians should dress appropriately and wear sunscreen.
- Smooth surfaces may cause slippery conditions due to frost and ice buildup. Exercise caution during cold conditions to prevent falls.
- Care must be exercised when working close to a roof edge when surrounding area is snow-covered, as the roof edge may not be clearly visible.
- Use proper stacking procedures to ensure sufficient stability of the materials.
- Exercise caution when walking on wet membrane. Membranes may be slippery when wet.
- Store PVC membrane in the original undisturbed plastic wrap in a cool, shaded area and cover with light-colored, breathable, waterproof tarpaulins. PVC membrane that has been exposed to the weather or

# MULE-HIDE PVC MEMBRANE

contaminated with dirt must be prepared with PVC Membrane Cleaner prior to hot-air welding.

## TYPICAL PHYSICAL PROPERTIES

Physical Property*	ASTM D4434 Requirement	50-mil	60-mil	80-mil
Thickness over scrim, in. (mm) ASTM D4434 optical method, ave of 3	0.016 min (0.40)	0.022 typ (0.559)	0.027 typ (0.686)	0.037 typ (0.940)
Weight, lbs/ft <sup>2</sup> (kg/m <sup>2</sup> )	No Requirement	0.33 (1.61)	0.40 (1.95)	0.55 (2.68)
Breaking Strength (MD x CD), lbf/in (kN/m) ASTM D751 grab method	275 min (48)	320 x 300 (56 x 53)	330 X 300 (58 x 55)	360 x 330 (63 x 58)
Elongation break of reinforcement (MD x CD) % ASTM D751 grab method	25 min	30 x 30	30 x 30	30 x 30
Tearing Strength (MD x CD), lbf (N) ASTM D751 proc. B, 8" x 8"	90 min (400)	100 x 120 (445 x 534)	100 x 130 (445 x 578)	100 x 132 (445 x 587)
Low Temperature Bend, no cracks @5x ASTM D2136	PASS	Pass -40°F (-40°C)	- Pass -40°F (-40°C)	Pass -40°F (-40°C)
Linear Dimensional Change % ASTM D1204, 6 hours @ 176° F (80° C)	±0.5 max	0.4 typ	0.4 typ	0.4 typ
Ozone Resistance, no cracks @ 7x ASTM D1149, 100 pphm, 168 hrs	PASS	PASS	PASS	PASS
Water absorption resistance, mass % ASTM D570 166 hrs @ 158° F (70° C)	±3.0 max	2.0 typ	2.0 typ	2.0 typ
Field seam strength, lbf/in. (kN/m) ASTM D1876 tested in peel	No Requirement	25 (4.4) min 60 (10.5) typ	25 (4.4) min 60 (10.5) typ	25 (4.4) min 60 (10.5) typ
Water Vapor Permeance, Perms ASTM E96 proc. B	No Requirement	0.10 max 0.05 typ	0.10 max 0.05 typ	0.10 max 0.05 typ
Puncture resistance Federal lbf (kN) FTM 101C, method 2031 Dynamic, J (ft-lb) ASTM D5635 Static, lbf (N) ASTM D5602	No Requirement 20 (14.7) 33 (145)	280 PASS PASS	320 PASS PASS	380 PASS PASS
Xenon-Arc Resistance, no cracks or crazing @ 10x, ASTM G155, 0.35 W/m <sup>2</sup> at 340 nm, 63°C B.P.T, 12,600 kJ/m <sup>2</sup> total radiant exposure 10,000 hrs	PASS	PASS	PASS	PASS
Properties after heat aging ASTM D3045, 56 days @ 176°F Breaking strength % retained Elongation rein., % retained	90 min 90 min	90 min 90 min	90 min 90 min	90 min 90 min

\*Typical properties and characteristics are based on samples tested and are not guaranteed for all samples of this product. This data and information is intended as a guide and does not reflect the specification range for any particular property of this product.

## Radiative Properties for Cool Roof Rating Council (CRRC) and LEED®

PHYSICAL PROPERTY	TEST METHOD	WHITE PVC	COOL TAN PVC	COOL GRAY PVC
CRRC initial solar reflectance	ASTM C1549	0.86	0.72	0.59
CRRC solar reflectance after 3 years	ASTM C1549 (uncleaned)	0.63	0.56	0.49
CRRC initial thermal emittance	ASTMC1371	0.89	0.87	0.89
CRRC thermal emittance after 3 years	ASTM C1371 (uncleaned)	0.87	0.87	0.89
CRRC SRI (Solar Reflectance Index)	ASTM E1980	108	88	70
CRRC SRI (Solar Reflectance Index - 3 yrs)	ASTM E1980	75	66	57
CRRC Product ID Number		0670-0015	0670-0035	0670-0036

# MULE-HIDE PVC MEMBRANE

LEED® Information	
Pre-consumer Recycled Content	10%
Post-consumer Recycled Content	0%
Manufacturing Location	Greenville, IL
Solar Reflectance Index (SRI)	White: 108, Tan 88, Gray 70

## **SUPPLEMENTAL APPROVALS, STATEMENTS and CHARACTERISTICS**

- Mule-Hide PVC meets or exceeds the requirements of ASTM D4434 Standard Specification for Poly (Vinyl Chloride) Sheet Roofing. Mule-Hide PVC is classified as Type III and/or Type IV as defined by ASTM D4434.
- Mule-Hide reinforced PVC was tested for dynamic puncture resistance per ASTM D5635-04 using the most recently modified impact head.
- 50-mil thick membrane was watertight after an impact energy of 22.5 J (16.6 ft-lbf), which passes the ASTM D4434 requirement.
- Mule-Hide reinforced PVC was tested for static puncture resistance per ASTM D5602-98 and exceeded 33 lbf (145 N), which passes the ASTM D4434 requirement.

## **PROTECTION & SAFETY**

Mule-Hide maintains Safety Data Sheets on all of its non-exempt products. Safety Data Sheets contain health and safety information for your development of appropriate product handling procedures to protect your employees and customers. Mule-Hide's Safety Data Sheets should be read and understood by all of your supervisory personnel and employees before using Mule-Hide products in your facilities.

## **ADDITIONAL INFORMATION**

The information given on this PDS is subject to change without notice. Always check the Mule-Hide website at [www.mulehide.com](http://www.mulehide.com) for the latest information, changes and updates or contact Mule-Hide Products Company at 800-786-1492.

## **DISCLAIMER**

The statements provided concerning the material shown are intended as a guide for material usage and are believed to be true and accurate at the time of printing. No statement made by anyone may supersede this information, except when done in writing by Mule-Hide Products Co., Inc. Since the manner of use is beyond our control, Mule-Hide does not authorize anyone to make any warranty of merchantability or fitness for any particular purpose or any other warranty, guarantee or representation, expressed or implied, concerning this material. This product may be eligible for a Mule-Hide warranty, please check the Mule-Hide website at [www.mulehide.com](http://www.mulehide.com) or contact Mule-Hide directly at 800-786-1492 for details. Buyer and user accept the product under these conditions and assume the risk of any failure, any injury person or property (including that of the user), loss or liability resulting from the handling, storage or use of the product whether or not it is handled, stored or used in accordance with the directions or specifications. Mule-Hide must be notified in writing of any claims and be given the opportunity to inspect the alleged failure before repairs are made.

## PRODUCT DATA SHEET

# Sarnafil® G 410-60 EnergySmart

Sarnafil G 410 Roof Membrane is a PVC thermoplastic membrane

### PRODUCT DESCRIPTION

Sarnafil® G 410-60 EnergySmart Roof Membrane is a PVC thermoplastic membrane produced with an integral fiberglass mat reinforcement for excellent dimensional stability, is highly reflective, with heat-weldable seams, and a unique lacquer coating applied to the top of the membrane to reduce dirt pick up.

### USES

Sarnafil G 410 is used in adhered applications with various adhesives over various substrates.

### AREAS OF APPLICATION

- New Roofs
- Reroofs
- Recovers
- Flashings

### CHARACTERISTICS / ADVANTAGES



- Highly reflective
- Excellent dimensional stability
- Factory applied lacquer coated to reduce dirt pick up
- Hot-air welded seams for long-term performance
- Proven membrane performance
- Superior fire resistance

### APPROVALS / STANDARDS

- FM Global
- Underwriters Laboratories
- Underwriters Laboratories of Canada
- ICC Code Compliance – ESR 1157
- Miami-Dade County
- Florida Building Code
- NSF/ANSI 347: Platinum Certified
- ENERGY STAR®
- California Title 24
- LEED / Green Globes



## PRODUCT INFORMATION

<b>Chemical Base</b>	High-quality, PVC membrane containing ultraviolet light stabilizers, flame retardant, and fiberglass reinforcement with a unique lacquer coating on the top surface.	
<b>Recycled Content</b>	9% Pre-consumer, 1% Post-consumer	
<b>Reinforcing Material</b>	Fiberglass	
<b>Packaging</b>	<b>60 mil (1.5 mm) Membrane (White, Reflective Gray, and Tan)</b> 10 ft x 100 ft (3 m x 30 m) roll, 389 lbs (177 kg) per roll, 8 rolls per pallet 5 ft x 100 ft (1.5 m x 30 m) roll, 195 lbs (89 kg) per roll, 12 rolls per pallet Coverstrip: 8" x 100 ft (20 cm x 30 m) roll, 25 lbs (12 kg) per roll, 25 rolls per pallet  <b>60 mil (1.5 mm) Membrane (Patina Green)</b> 6.56 ft x 65.6 ft (2 m x 20 m) roll, 168 lbs (76 kg) per roll, 19 rolls per pallet Coverstrip: 8" x 100 ft (20 cm x 30 m) roll, 25 lbs (12 kg) per roll, 25 rolls per pallet	
<b>Appearance / Color</b>	<ul style="list-style-type: none"><li>Top: White, Reflective Gray, Tan, and Patina Green</li><li>Bottom: Gray</li></ul>	
<b>Shelf Life</b>	N/A	
<b>Storage Conditions</b>	Store rolls on pallets and fully protected from the weather with clean canvas tarpaulins. Unvented polyethylene tarpaulins are not accepted due to the accumulation of moisture beneath the tarpaulin in certain weather conditions that may affect the ease of membrane weldability.	
<b>Overall Thickness</b>	60 mil (minimum thickness) 45 mil	(ASTM D-751) (ASTM Type II D-4434 Spec. Requirement)
<b>Thickness Above Scrim</b>	27 mil 16 mil	(ASTM D-7635) (ASTM Type II D-4434 Spec. Requirement)

## TECHNICAL INFORMATION

<b>Resistance to Static Puncture</b>	Pass 33 lbf (15 kg)	(ASTM D-5602) (ASTM Type II D-4434 Spec. Requirement)
<b>Resistance to Dynamic Puncture</b>	Pass 7.3 ft-lbf (10 J)	(ASTM D-5635) (ASTM Type II D-4434 Spec. Requirement)
<b>Tensile Strength</b>	80 lbf (356 N) 55 lbf (245 N)	(ASTM D-751) (ASTM Type II D-4434 Spec. Requirement)
<b>Elongation at Break</b>	250 & 220% MD & CMD <sup>1</sup> 250 & 220% MD & CMD <sup>1</sup>	(ASTM D-751) (ASTM Type II D-4434 Spec. Requirement)
	<sup>1</sup> MD = Machine Direction, CMD = Cross Machine Direction.	
<b>Linear Dimensional Change</b>	-0.02% 0.1%	(ASTM D-1204) (ASTM Type II D-4434 Spec. Requirement)
<b>Tear Strength</b>	17.5 lbf (78 N) 10 lbf (45 N)	(ASTM D-1004) (ASTM Type II D-4434 Spec. Requirement)

<b>Seam Strength</b>	Pass 75% of original <sup>2</sup>	(ASTM D-751) (ASTM Type II D-4434 Spec. Requirement)
	<sup>2</sup> Failure occurs through membrane rupture not seam failure.	
<b>Low Temperature Bend</b>	Pass Pass -40°F (-40°C)	(ASTM D-2136) (ASTM Type II D-4434 Spec. Requirement)
<b>Retention of Properties after Heat Ageing</b>	Tensile Strength, % of original: Pass Elongation, % of original: Pass Tensile Strength, % of original: 90 Elongation, % of original: 90	(ASTM D-3045) (ASTM D-751) (ASTM Type II D-4434 Spec. Requirement)
<b>UV Exposure</b>	10,000 hours 5,000 hours Cracking (7x magnification) Discoloration (by observation) Crazing (7x magnification)	(ASTM G-154) (ASTM Type II D-4434 Spec. Requirement) None Negligible None
<b>Weight Change after Immersion in Water</b>	1.9% ± 3.0%	(ASTM D-570) (ASTM Type II D-4434 Spec. Requirement)
<b>Solar Reflectance</b>	<b>EnergySmart Colors</b>	<b>Initial Solar Reflectance<sup>1</sup></b> <b>3-Year Solar Reflectance<sup>1</sup></b>
	EnergySmart White <sup>2</sup>	0.85 0.74
	EnergySmart Tan <sup>2</sup>	0.73 0.65
	EnergySmart Reflective Gray <sup>2</sup>	0.73 0.66
	EnergySmart Patina Green <sup>3</sup>	0.55 0.46
	<sup>1</sup> Solar Reflectance testing according to ASTM C1549.	
	<sup>2</sup> Meets ENERGY STAR®, LEED, Green Globes, and California's Title 24 criteria for Low and Steep Slope applications.	
	<sup>3</sup> Meets ENERGY STAR®, LEED, Green Globes, and California's Title 24 criteria for Steep Slope applications.	
<b>Thermal Emittance</b>	<b>EnergySmart Colors</b>	<b>Initial Thermal Emittance<sup>1</sup></b> <b>3-Year Thermal Emittance<sup>1</sup></b>
	EnergySmart White <sup>2</sup>	0.86 0.84
	EnergySmart Tan <sup>2</sup>	0.85 0.86
	EnergySmart Reflective Gray <sup>2</sup>	0.89 0.88
	EnergySmart Patina Green <sup>3</sup>	0.86 0.85
	<sup>1</sup> Thermal Emittance testing according to ASTM C1371, Slide Method.	
	<sup>2</sup> Meets ENERGY STAR®, LEED, Green Globes, and California's Title 24 criteria for Low and Steep Slope applications.	
	<sup>3</sup> Meets ENERGY STAR®, LEED, Green Globes, and California's Title 24 criteria for Steep Slope applications.	

## Solar Reflectance Index

EnergySmart Colors	Initial Solar Reflectance Index <sup>1</sup>	3-Year Solar Reflectance Index <sup>1</sup>
EnergySmart White <sup>2</sup>	107	90
EnergySmart Tan <sup>2</sup>	89	78
EnergySmart Reflective Gray <sup>2</sup>	90	80
EnergySmart Patina Green <sup>3</sup>	64	51

<sup>1</sup> Solar Reflectance Index calculated according to ASTM E1980.

<sup>2</sup> Meets ENERGY STAR®, LEED, Green Globes, and California's Title 24 criteria for Low and Steep Slope applications.

<sup>3</sup> Meets ENERGY STAR®, LEED, Green Globes, and California's Title 24 criteria for Steep Slope applications.

## APPLICATION INSTRUCTIONS

### APPLICATION

Sarnafil G 410 is installed after proper preparation of the approved substrate. The membrane is unrolled into Sarnacol® adhesive in accordance with Sika's technical requirements and then pressed into place with a minimum 75 lb (34 kg) steel roller. Sarnafil G 410 seams are heat-welded together by trained operators using hot-air welding equipment. Different Sarnacol adhesives require different application methods. Please consult Sika's Specifications or Applicator Handbook for detailed installation procedures.

### MAINTENANCE

Standard maintenance of Sarnafil systems should include regular inspections of flashings, drains, and termination sealants at least twice a year and after each storm.

## AVAILABILITY/WARRANTY

### AVAILABILITY

From Sika Corporation – Roofing Authorized Applicators for use within Sarnafil or Sikaplan systems.

### WARRANTY

Upon successful completion of the installed roof by the Sika Authorized Applicator, Sika Corporation will provide a warranty to the Building Owner via the Sika Authorized Applicator.

## BASIS OF PRODUCT DATA

Results may differ based upon statistical variations depending upon mixing methods and equipment, temperature, application methods, test methods, actual site conditions and curing conditions.

## OTHER RESTRICTIONS

See Legal Disclaimer.

Product Data Sheet  
Sarnafil® G 410-60 EnergySmart  
August 2020, Version 06.01  
020905052220153002

## ENVIRONMENTAL, HEALTH AND SAFETY

For further information and advice regarding transportation, handling, storage and disposal of chemical products, user should refer to the actual Safety Data Sheets containing physical, environmental, toxicological and other safety related data. User must read the current actual Safety Data Sheets before using any products. In case of an emergency, call CHEMTREC at 1-800-424-9300, International 703-527-3887.

## LEGAL DISCLAIMER

- KEEP CONTAINER TIGHTLY CLOSED
- KEEP OUT OF REACH OF CHILDREN
- NOT FOR INTERNAL CONSUMPTION
- FOR INDUSTRIAL USE ONLY
- FOR PROFESSIONAL USE ONLY

Prior to each use of any product of Sika Corporation, its subsidiaries or affiliates ("SIKA"), the user must always read and follow the warnings and instructions on the product's most current product label, Product Data Sheet and Safety Data Sheet which are available at [usa.sika.com](http://usa.sika.com) or by calling SIKA's Technical Service Department at 1-800-933-7452. Nothing contained in any SIKA literature or materials relieves the user of the obligation to read and follow the warnings and instructions for each SIKA product as set forth in the current product label, Product Data Sheet and Safety Data Sheet prior to use of the SIKA product.

SIKA warrants this product for one year from date of installation to be free from manufacturing defects and to meet the technical properties on the current Product Data Sheet if used as directed within the product's shelf life. User determines suitability of product for intended use and assumes all risks. User's and/or buyer's sole remedy shall be limited to the purchase price or replacement of this product exclusive of any labor costs. **NO OTHER WARRANTIES EXPRESS OR IMPLIED SHALL APPLY INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. SIKA SHALL NOT BE LIABLE UNDER ANY LEGAL THEORY FOR SPECIAL OR CONSEQUENTIAL DAMAGES. SIKA SHALL NOT BE RESPONSIBLE FOR THE USE OF THIS PRODUCT IN A MANNER TO INFRINGE ON ANY PATENT OR ANY OTHER INTELLECTUAL PROPERTY RIGHTS HELD BY OTHERS.**

Sale of SIKA products are subject to the Terms and Conditions of Sale which are available at <https://usa.sika.com/en/group/SikaCorp/termsandconditions.html> or by calling 1-800-933-7452.

### Sika Corporation

201 Polito Avenue  
Lyndhurst, NJ 07071  
Phone: +1-800-933-7452  
Fax: +1-201-933-6225  
[usa.sika.com](http://usa.sika.com)

### Sika Sarnafil

100 Dan Road  
Canton, MA 02021  
Phone: +1 800-451-2504  
Fax: +1 781-828-5365  
[usa.sika.com/sarnafil](http://usa.sika.com/sarnafil)  
[webmaster.sarnafil@us.sika.com](mailto:webmaster.sarnafil@us.sika.com)

### Sika Mexicana S.A. de C.V.

Carretera Libre Celaya Km. 8.5  
Fracc. Industrial Balvanera  
Corregidora, Queretaro  
C.P. 76920  
Phone: 52 442 2385800  
Fax: 52 442 2250537



### Product Data Sheet

Sarnafil® G 410-60 EnergySmart  
August 2020, Version 06.01  
020905052220153002

SarnafilG410-60EnergySmart-en-US-(08-2020)-6-1.pdf



# King County iMap



King County, EagleView Technologies, Inc.

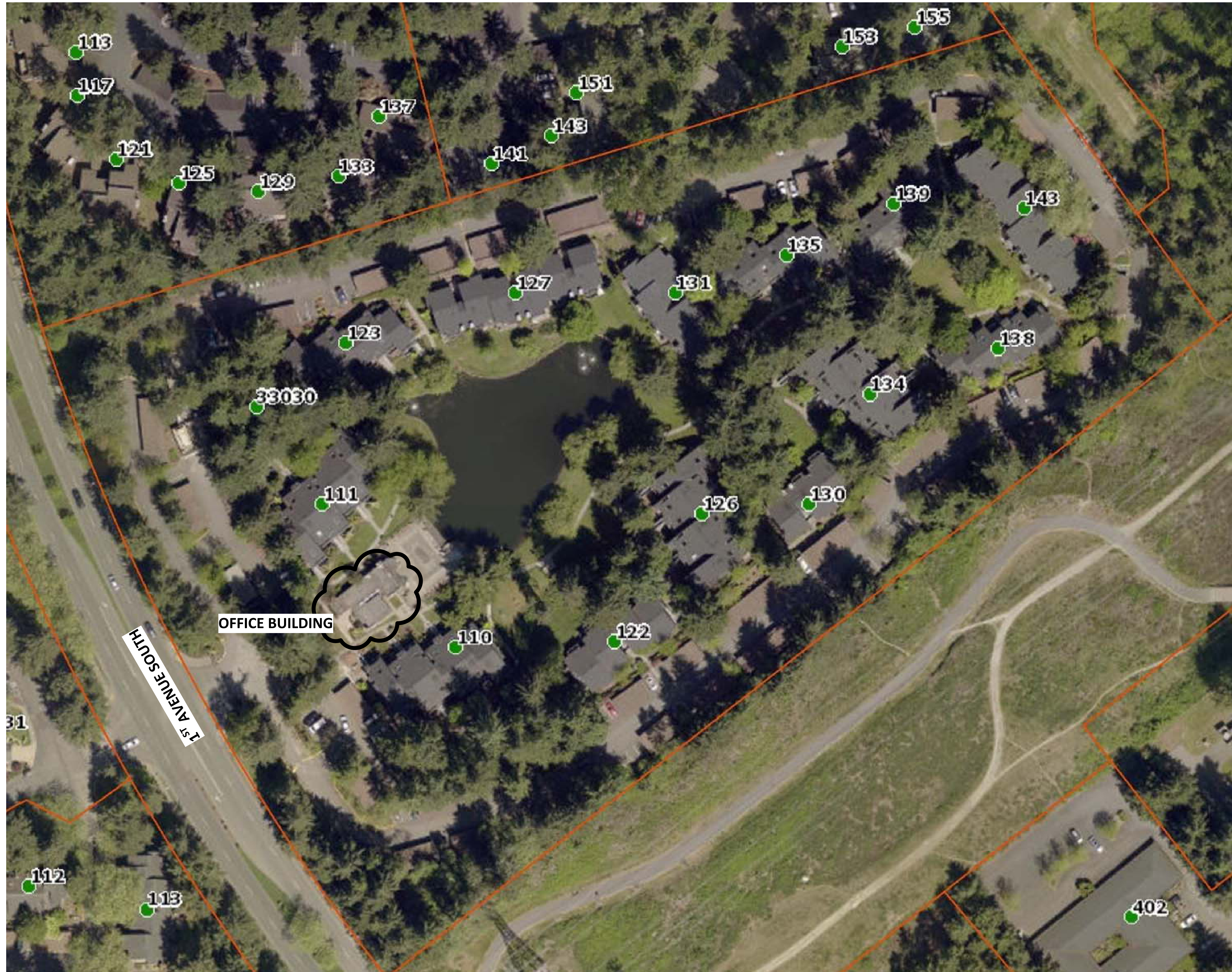
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Date: 3/24/2023

Notes:



**King County**



**COVE EAST APARTMENTS**  
 33030 1<sup>ST</sup> AVENUE, FEDERAL WAY, WA 98003  
**ROOFING REPLACEMENT**

Date: **OCTOBER 1, 2020**  
 Revisions:  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Drawn: **HUGH WATKINSON**

PLAN A1.0

AREAS OF WORK 



# INSTRUCTIONS TO BIDDERS

## 1.0 BIDDER RESPONSIBILITY CRITERIA

- A. It is the intent of Owner to award a contract to a responsible bidder submitting the lowest responsive bid. Before award, the bidder must meet the following bidder responsibility criteria to be considered a responsible bidder. The bidder may be required by the Owner to submit documentation demonstrating compliance with the criteria. The bidder must:
1. Have a current certificate of registration as a contractor in compliance with chapter 18.27 RCW, which must have been in effect at the time of bid submittal;
  2. Have a current Washington Unified Business Identifier (UBI) number;
  3. If applicable, have industrial insurance coverage for the bidder's employees working in Washington as required in Title 51 RCW; an employment security department number as required in Title 50 RCW; and a state excise tax registration number as required in Title 82 RCW;
  4. Not be disqualified from bidding on any public works contract under RCW 39.06.010 or 39.12.065(3);
  5. Have received training on the requirements related to public works and prevailing wage under chapter 39.04.350 RCW and chapter 39.12 RCW or be listed as exempt by the department of labor and industries on its website; and
  6. Within the three-year period immediately preceding the date of the bid solicitation, not have been determined by a final and binding citation and notice of assessment issued by the department of labor and industries or through a civil judgment entered by a court of limited or general jurisdiction to have willfully violated, as defined in RCW 49.48.082, any provision of chapter 49.46, 49.48, or 49.52 RCW;
  7. Before award of a public works contract, a bidder shall submit to the contracting agency a signed statement in accordance with RCW 9A.72.085 verifying under penalty of perjury that the bidder is in compliance with the responsible bidder criteria requirement of subsection A, 6 of this section.

## 1.1 SUBCONTRACTOR RESPONSIBILITY

- A. The Contractor shall include the language of this section in each of its first tier subcontracts, and shall require each of its subcontractors to include the same language of this section in each of their subcontracts, adjusting only as necessary the terms used for the contracting parties. Upon request of the Owner, the Contractor shall promptly provide documentation to the Owner demonstrating that the subcontractor meets the subcontractor responsibility criteria below. The requirements of this section apply to all subcontractors regardless of tier.
- B. At the time of subcontract execution, the Contractor shall verify that each of its first tier subcontractors meets the following bidder responsibility criteria:
1. Have a current certificate of registration in compliance with chapter 18.27 RCW, which must have been in effect at the time of subcontract bid submittal;
  2. Have a current Washington Unified Business Identifier (UBI) number;
  3. If applicable, have:
    - a. Have Industrial Insurance (workers' compensation) coverage for the subcontractor's employees working in Washington, as required in Title 51 RCW;
    - b. A Washington Employment Security Department number, as required in Title 50 RCW;

# INSTRUCTIONS TO BIDDERS

- c. A Washington Department of Revenue state excise tax registration number, as required in Title 82 RCW;
  - d. An electrical contractor license, if required by Chapter 19.28 RCW;
  - e. An elevator contractor license, if required by Chapter 70.87 RCW.
4. Not be disqualified from bidding on any public works contract under RCW 39.06.010 or 39.12.065 (3);
  5. Have received training on the requirements related to public works and prevailing wage under chapter 39.04.350 RCW and chapter 39.12 RCW or be listed as exempt by the department of labor and industries on its website; and
  6. Within the three-year period immediately preceding the date of the bid solicitation, not have been determined by a final and binding citation and notice of assessment issued by the department of labor and industries or through a civil judgment entered by a court of limited or general jurisdiction to have willfully violated, as defined in RCW 49.48.082, any provision of chapter 49.46, 49.48, or 49.52 RCW.

## 1.2 SUPPLEMENTAL BIDDER RESPONSIBILITY CRITERIA

- A. RCW 39.04.350(2) specifically authorizes municipalities to adopt relevant supplement criteria for determining bidder responsibility applicable to a particular project which the bidder must meet.
- B. For the work in this project a responsible/qualified Bidder must meet the following standards:
  1. Have a current certificate of registration as a contractor, in compliance with chapter 18.27 RCW, for the last three years under the same business name;
  2. Have a good record of past performance that includes, but is not limited to, high quality work, ability to complete projects on time, contractor's integrity, compliance with public policy, financial, contractual and tax obligations, as well as Federal and State rules and regulations in performing construction contracts.
  3. Have a current Experience Modification Rate (EMR) of 1.0 or less, or an average EMR rate of 1.0 or less over the last three years. The requirement may, at the Owner's sole discretion, be waived on review of a written explanation that includes details of accidents, L&I records, a Loss Ratio Report for the last five years, costs, dates of events, and changes that have been made by the contractor to reduce accidents. A current company Safety Plan shall also be reviewed.
  4. Bidder shall provide evidence of previous successful completion of flat roof projects of similar scope and complexity. Poor performance, lack of response, or failure to complete projects successfully within the contract time may be grounds for the rejection of bidder.
- C. Subcontractors shall have had three years minimum experience licensed in Washington State in the specific specialty contracting business.

## 1.3 PREPARATION OF BIDS – CONSTRUCTION

- A. Bids must be submitted on the Bid Form furnished by the Owner.
- B. All fields and questions on required forms must be fully answered and complete. Failure to do so may result in the bid being declared non-responsive.



# INSTRUCTIONS TO BIDDERS

- C. Bidders shall acknowledge receipt of all addenda to this solicitation by inserting the addenda numbers in the space provided on the Bid Form. Failure to do so may result in the bid being declared non-responsive.
  - 1. Bidder is responsible for checking KCHA's website for addenda prior to submitting bid.
- D. In order for a bid to be considered responsive, bidders must submit the following signed documents with their bid package:
  - 1. Bid Form
  - 2. Bidder's Information Form
- E. The Bidder agrees to hold the base bid prices for sixty (60) days from date of bid opening.

## 1.4 AMENDMENTS TO INVITATION TO BID

- A. If this solicitation is amended, then all terms and conditions which are not modified remain unchanged.
- B. Bidders shall acknowledge receipt of all addenda to this solicitation by inserting the addenda numbers in the space provided on the Bid Form. Failure to do so may result in the bid being declared non-responsive.
  - 1. Bidder is responsible for checking KCHA's website for addenda prior to the bid due date.
  - 2. Addenda will not be issued later than three (3) calendar days before the deadline for receipt of Bids except Addendum withdrawing the request for Bids or extending the deadline for receipt of Bids.

## 1.5 PRE-BID MEETING

- A. All potential bidders are strongly encouraged to attend. Oral statements may not be relied upon and will not be binding or legally effective.

## 1.6 EXAMINATION OF PLANS, SPECIFICATIONS, AND SITE

- A. Before submitting a bid, the Bidder shall carefully examine each component of the Contract Documents prepared for the Work and any other available supporting data so as to be thoroughly familiar with all the requirements.
- B. The Bidder shall obtain copies of all agencies and associations guidelines and standards cited in the Contract Documents and necessary to perform the Work, including full size reproductions of material provided by Owner, at their own expense.
- C. The Bidder shall make a thorough and reasonable examination of the project site, facility and conditions under which the Work is to be performed, including but not limited to: Building access; resident occupancy; fire lanes; landscaping; obstacles and character of materials which may be encountered; traffic conditions; public and private utilities; the availability and cost of labor; and available facilities for transportation, handling, and storage of materials and equipment.

# INSTRUCTIONS TO BIDDERS

## 1.7 EXPLANATION TO PROSPECTIVE BIDDERS

- A. Any prospective bidder desiring an explanation or interpretation of the solicitation, drawings, specifications, etc., must submit a request in writing to the Owner seven (7) calendar days before the bid due date. Oral explanations or instructions given before the award of a contract will not be binding. Questions shall be submitted to:

Michelle Jackson  
King County Housing Authority  
600 Andover Park W  
Seattle, WA 98188  
Email: [MichelleJ@kcha.org](mailto:MichelleJ@kcha.org)

## 1.8 PREVAILING WAGES

- A. Contractor shall pay no less than the Washington State Department of Labor and Industries (L&I) prevailing rate of wages to all workers, laborers, or mechanics employed in the performance of any part of the Work in accordance with RCW 39.12 and the rules and regulations of L&I. The schedule of prevailing wage rates for the locality or localities of the Work is determined by the Industrial Statistician of L&I. It is the Contractor's responsibility to verify the applicable prevailing wage rate.
1. L&I prevailing wage rates may be found at <https://lni.wa.gov/licensing-permits/public-works-projects/prevailing-wage-rates/>
  2. The Owner has determined that the work does not meet the definition of residential construction.
  3. The prevailing wage rates publication date is determined by the bid due date.
  4. The work is to be performed in King County.
  5. A copy of the prevailing wage rates is available at KCHA.
  6. A copy of the prevailing wage rates may be mailed on request.

## 1.9 TAXES

- A. All taxes imposed by law shall be included in the bid amount. The Contractor shall pay the WSST to the Department of Revenue and shall furnish proof of payment to the Owner if requested.
- B. The retail sales tax does not apply to the gross contract price as indicated in WAC 458-20-17001.
- C. Prime and subcontractors are required to pay retail sales tax upon all purchases of materials, including prefabricated and precast items, equipment, leases or rentals of tools, consumables, and other tangible personal property which is installed, applied, attached, or otherwise incorporated in their work.

## 1.10 ASSURANCE OF COMPLETION

- A. Payment and performance bonds for 100% of the Contract Sum, including all Change Orders and taxes imposed by law, shall be furnished for the Work, and shall be in a form acceptable to the Owner.

# INSTRUCTIONS TO BIDDERS

1. On contracts of one hundred fifty thousand dollars (\$150,000.00) or less, the requirement for a Performance and Payment Bond may, at Contractors option, be waived in lieu of an additional 5% (total 10%) retainage.

## 1.11 BID ERROR

- A. In the event Bidder discovers an error in its bid, the Bidder may, under certain conditions and if before the date and time that bids are due, modify, their bid, as detailed below:

1. Prior to Date and Time Bids are Due:

- a. A Bidder may withdraw its bid at any time prior to the date and time bids are due upon written request.
- b. After withdrawing an original submitted bid, a Bidder may modify and resubmit its bid at any time prior to the date and time bids are due.

2. After the Date and Time Bids are Due:

- a. A bidder who submits an erroneous low bid may withdraw the bid. The bid withdrawal is permissible if there was an obvious error in the low bid, and the mistake is readily apparent from the bid itself.
- b. Notification: Provide to the Owner, within 24 hours of bid opening, written notification of the bidder's intent to withdraw the bid due to error.
- c. Documentation: Provide to the Owner within 48 hours of bid opening, documentation sufficient in content to justify bid withdrawal to the satisfaction of the Owner. Include description and evidence of the error.
- d. Approval: the Owner will approve or reject the request for withdrawal in writing.
- e. Any low bidder who withdraws its bid is prohibited from bidding on the same project if it is subsequently re-solicited.

## 1.12 ADDITIVE OR DEDUCTIVE BID ITEMS

- A. The low bid, for purposes of award, shall be the lowest responsive bid from a qualified responsible bidder offering the low aggregate amount for the base bid, plus additive or deductive bid alternates selected by the Owner.

## 1.13 BID EVALUATION

- A. Responsive Bids: A bid will be considered responsive if it meets the conditions of the solicitation, in addition to but not limited to the following requirements:

1. Bid is received not later than the time and date specified.
2. Bid is submitted in the proper format on the form(s) provided.
3. Bid includes the complete scope of work as defined in bid package.
4. Bid does not include any exclusions or qualifications.
5. Bid includes Unit and Lump Sum Costs as listed in Proposal Form.
6. Forms are complete.

- B. After bid opening, bids will be checked for correctness of bid item price extensions and the total bid price. A discrepancy between a bid item price and the extended amount of any bid item shall be resolved by accepting the bid item price as correct.

# INSTRUCTIONS TO BIDDERS

- C. Responsible Bidders: the Owner will award contracts only to responsible bidders who demonstrate the ability to successfully perform under the terms and conditions as set forth in the Contract Documents and have successfully completed projects similar in scope and complexity.
  - 1. Bidders must demonstrate relevant experience on similar types of projects and submit detailed information as required on the Bidder Information Form.
- D. The Owner reserves the right to contact references and investigate past performance and qualifications of the Bidder, subcontractor, and project team members, including contacting third parties and/or the references provided by the Bidder.
  - 1. The Owner may contact references for other projects including those the Bidder did not identify and/or provided references.
  - 2. References may be asked to rate the performance of and describe their experience with project team members and subcontractors. Bidder Information may be solicited and evaluated on the following subjects: type and features of work; overall quality of project performance and quality of work; experience and technical knowledge and competence of the Bidder and Project Team Members; ability, capacity and skill to perform the Work; ability to manage submittals, requests for information, prevailing wage filings, and other paperwork; compliance with laws, ordinances, and contract provisions; and other information as deemed necessary.
  - 3. Poor reference(s) may be justification to determine a Bidder is not responsible.
- E. At the Owner's request, provide any additional explanation or information, which would assist in evaluating the qualifications of the Bidder, subcontractors, project team members, and bid price.
- F. The Owner will verify information submitted and if the lowest bidder is determined to be “not responsible,” the Owner will issue, in writing, the specific reasons for this determination. The bidder may appeal this decision. The appeal must be in writing and shall be delivered to the Owner within two business days. The appeal may include additional information that was not included in the original bid documents. KCHA will make a final determination after the receipt of the appeal. The final determination may not be appealed.

## 1.14 CONTRACT AWARD

- A. Bonding and Insurance: Contract award will be contingent on ability to secure payment/performance bonding, and Contractor’s ability to meet the Owner insurance requirements as detailed in the Bid Documents.
- B. Bonding, insurance certificates and endorsements, and an approved Statement of Intent to Pay Prevailing Wages shall be submitted to the Owner within 14 days of award. A Notice to Proceed shall be issued immediately after receipt.
- C. Right to Reject Bids/Waiver: The Owner reserves the right to reject any or all bids or to waive any informalities or irregularities in the bidding.
- D. Retainage Funds: The Owner will not pay interest to the Contractor for accounts where retainage funds are maintained by the Owner. As part of the procurement by which the Contractor was selected for this work, the Contractor agrees to waive any other options and has made allowances for this waiver.

# GENERAL CONDITIONS

## PART 1 - GENERAL PROVISIONS

### 1.1 DEFINITIONS

- A. "Authority Having Jurisdiction (AHJ)": A federal, state, local, or other regional department, or an individual such as a fire official, labor department, health department, building official, or other individual having statutory authority.
- B. "Contract Documents" means the Instructions to Bidders, Specifications, Plans, General Conditions, Prevailing Wage Rates, Bid Form, Contract Form, other Special Forms, Drawings and Specifications, and all Addenda and modifications thereof.
- C. "Contract Sum" is the total amount payable by Owner to Contractor for performance of the Work in accordance with the Contract Documents.
- D. "Contract Time" is the number of consecutive Days allotted in the Contract Documents for achieving completion of the Work.
- E. "Contracting Officer" means the person delegated the authority by King County Housing Authority to enter into, and/or terminate this Contract. The term includes any successor Contracting Officer and any duly authorized representative of the Contracting Officer.
- F. "Contractor" means the person or other entity entering into the Contract with King County Housing Authority to perform all of the services or work required under the Contract.
- G. "Day" means calendar day, unless otherwise specified.
- H. "Final Acceptance" means the acceptance by Owner that the Contractor has completed the requirements of the Contract Documents.
- I. "Force Majeure" means those acts entitling Contractor to request an equitable adjustment in the Contract Time, including, but not limited to, unusually severe weather conditions which could not have been reasonably anticipated.
- J. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- K. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- L. "Liquidated Damages" means the amount prescribed in the Contract Documents to be deducted from any payments due or to become due Contractor, for each day's delay in completion of the Work beyond the time allowed in the Contract Documents as stated in the Notice to Proceed, plus any extensions of such time.
- M. "Manager" means the person who is an authorized agent of the King County Housing Authority to administer the Contract.
- N. "Notice to Proceed" means a notice from Owner to Contractor that defines the date on which the Contract Time begins to run.
- O. "Owner" means the King County Housing Authority or its authorized representative with the authority to enter into, administer, and/or terminate the Work in accordance with the Contract Documents and make related determinations and findings.
- P. "Property Manager" means the property management company, its officers and employees.
- Q. "Provide": Furnish and install, complete and ready for the intended use.

# GENERAL CONDITIONS

- R. "Subcontract" means any contract, purchase order, or other purchase agreement, including modifications and change orders to the foregoing, entered into by a Subcontractor to furnish supplies, materials, equipment, and services for the performance of the prime Contract or a subcontract.
- S. "Subcontractor" means any supplier, vendor, or firm that furnishes supplies, materials, equipment, or services to or for the Contractor or another Subcontractor.
- T. "Work" means the construction and services required by the Contract Documents, and includes, but is not limited to, labor, materials, supplies, equipment, services, permits, and the manufacture and fabrication of components, performed, furnished, or provided in accordance with the Contract Documents.

## 1.2 EXECUTION AND INTENT

- A. The intent of the Specifications and Drawings is to describe a complete Project to be constructed in accordance with the Contract Documents. Contractor shall furnish all labor, materials, equipment, tools, transportation, permits, and supplies, and perform the Work required in accordance with the Contract Documents.
- B. All work is to be executed in accordance with the Building Codes, as adopted by the Authority Having Jurisdiction, and other applicable codes and generally accepted industry standards. All products and materials are to be new and handled and applied in accordance with the manufacturer's recommendations.
- C. Contractor makes the following representations to Owner:
  - 1. The Contract Sum is reasonable compensation for the Work and the Contract Time is adequate for the performance of the Work, as represented by the Contract Documents;
  - 2. Contractor has carefully reviewed the Contract Documents, had an opportunity to visit and examine the Project site, has become familiar with the local conditions in which the Work is to be performed, and has satisfied itself as to the nature, location, character, quality and quantity of the Work, the labor, materials, equipment, goods, supplies, work, permits, services and other items to be furnished and all other requirements of the Contract Documents, as well as the surface and subsurface conditions and other matters that may be encountered at the Project site or affect performance of the Work or the cost or difficulty thereof.
- D. The Contract Documents are complementary. What is required by one part of the Contract Documents shall be binding as if required by all. Anything mentioned in the Specifications and not shown on the Drawings, or shown on the Drawings and not mentioned in the Specifications, shall be of like effect as if shown or mentioned in both.

## PART 2 - INSURANCE AND BONDS

### 2.1 INSURANCE REQUIREMENTS FOR BUILDING TRADES CONTRACTORS

- A. Contractor shall procure and maintain for the duration of the contract insurance against claims for injuries to persons or damages to property that may arise from or in connection with the performance of the work hereunder by the Contractor, his agents, representatives, employees or Subcontractors.

### 2.2 MINIMUM SCOPE OF INSURANCE

- A. Contractors shall maintain coverages no less than:
  - 1. Insurance Services Office Commercial General Liability coverage including Products/Completed Operations.
  - 2. Insurance Services Office covering Automobile Liability, code 1 (any auto).
  - 3. Workers' Compensation insurance as required by State law and Employer's Liability Insurance.

# GENERAL CONDITIONS

## 2.3 MINIMUM LIMITS OF INSURANCE

### A. Contractor shall maintain limits no less than:

1. General Liability: \$1,000,000 per occurrence for bodily injury, personal injury and property damage. If Commercial General Liability Insurance or other form with a general aggregate limit is used, either the general aggregate limit shall apply separately to this project/location or the general aggregate limit of \$2,000,000.
2. Automobile Liability: \$1,000,000 per accident for bodily injury and property damage.  
Employer's Liability: \$1,000,000 per accident for bodily injury/sickness or disease.

## 2.4 DEDUCTIBLES AND SELF INSURED RETENTION

- ### A.
- Any deductibles or self-insured retentions must be declared to and approved by the Owner. At the option of the Owner, either: the insurer shall reduce or eliminate such deductibles or self-insured retentions as respects the Owner, its officers, officials, employees and volunteers; or the Contractor shall provide a financial guarantee satisfactory to the Owner guaranteeing payment of losses and related investigations, claim administration and defense expenses. **NOTE: If this contract deals with hazardous materials or activities (i.e. lead based paint, asbestos, armed security guards) additional provisions covering those exposures must be included in order to protect the Owner's interests.**

## 2.5 OTHER INSURANCE PROVISIONS

### A. The policies are to contain, or be endorsed to contain, the following provisions:

1. The Owner, the Property Manager, its officers, officials, employees, partners, agents and volunteers are to be covered as additional insureds under a "completed operations" type of additional insured endorsement with respect to general liability arising out of work or operations performed by or on behalf of the Contractor including materials, parts or equipment furnished in connection with such work or operations. The endorsement(s) effectuating the foregoing additional insured coverage shall be ISO form CG 20 10 11 85, or CG 20 10 10 01 issued concurrently with CG 20 37 10 01, or their equivalent as long as it provides additional insured coverage, without limitation, for completed operations; (ii) automobile liability arising out of vehicles owned, leased, hired, or borrowed by or on behalf of the Contractor; (iii) any insurance written on a claims made basis, shall have a retroactive date that coincides with, or precede, the commencement of any work under this contract. Evidence of such coverage shall be maintained for a minimum of six (6) years beyond the expiration of the project.
2. King County will not accept Certificates of Insurance Alone. Improperly Completed Endorsements will be returned to your insured for correction by an authorized representative of the insurance company.
3. For any claims related to this project, the Contractor's insurance coverage shall be primary insurance as respects the Owner, its officers, officials, agents, partners, employees, and volunteers. Any insurance or self-insurance maintained or expired by the Owner, its officers, officials, agents, partners, employees, volunteers, or shall be excess of the Contractor's insurance and shall not contribute with it. King County Housing Authority's Insurance is Non-Contributory in Claims Settlement Funding.
4. The "General description of agreement(s) and/or activity(s) insured" shall include reference to the activity and/or to either specific King County Housing Authority's; project of site name, contract number, lease number, permit number or construction approval number.
5. Each insurance policy required by this clause shall be endorsed to state that coverage shall not be canceled or materially changed, except after thirty (30) days' [ten (10) days for non-payment of premium] prior written notice by certified mail, return receipt requested, has been given to the Owner.
6. Maintenance of the proper insurance for the duration of the contract is a material element of the contract. Material changes in the required coverage or cancellation of the coverage shall constitute a material breach of the contract.

## 2.6 ACCEPTABILITY OF INSURERS

- ### A.
- Insurance is to be placed with insurers with a current A.M. Best's rating of no less than A-:VII. The name of the Insurance Company underwriting the coverage and its address shall be noted on the endorsement form. Contractors must provide written verification of their insurer's rating.

# GENERAL CONDITIONS

## 2.7 VERIFICATION OF COVERAGE

- A. Contractor shall furnish the Owner with original certificates and amendatory endorsements effecting coverage required by this clause. All certificates and endorsements are to be received and approved by the Owner before work commences in sufficient time to permit contractor to remedy any deficiencies. The Owner reserves the right to require complete, certified copies of all required insurance policies or pertinent parts thereof, including endorsements affecting the coverage required by these specifications at any time.

## 2.8 SUBCONTRACTORS

- A. Subcontractors shall include the Contractor as additional insured under their policies. All coverage's for subcontractors shall be subject to all of the requirements stated herein. Contractor shall be responsible for the adequacy of required coverages for subcontractors, and compile related certificates of insurance and endorsements evidencing subcontractors' compliance.

## 2.9 PAYMENT AND PERFORMANCE BONDS

- A. Payment and performance bonds for 100% of the Contract Award Amount shall be furnished for the Work, using the Payment Bond and Performance Bond form AIA – form A312. Change order increases of cumulative 15% increments require revisions to the bond to match the new Contract Sum.
- B. On contracts of one hundred fifty thousand dollars or less, at the option of the contractor as defined in RCW 39.10.210, the Owner may, in lieu of the bond, retain ten percent of the contract amount for a period of forty-five days after date of final acceptance, or until receipt of all necessary releases from the department of revenue, the employment security department, and the department of labor and industries and settlement of any liens filed under chapter 60.28 RCW, whichever is later.

## PART 3 - PERFORMANCE

### 3.1 CONTRACTOR CONTROL AND SUPERVISION

- A. Contractor shall be solely responsible for, and have control over construction means, methods, techniques, sequences, and procedures and for coordinating all portions of the Work, and shall be responsible to Owner for acts and omissions of Contractor, Subcontractors, and their employees and agents.
- B. Contractor shall enforce strict discipline and good order among Contractor's employees and other persons performing the Work. Contractor shall not permit employment of persons not skilled in tasks assigned to them. Owner may, by Notice, request Contractor to remove from the Work or Project site any employee Owner reasonably deems incompetent, careless, or otherwise objectionable.
- C. The Contractor shall perform on the site, and with its own organization, work equivalent to at least 12% of the total amount of work to be performed under the contract.
- D. Work Hours: The Contractor's allowable hours of operation shall be limited to those hours between 8:00 A.M. and 6:00 P.M. Monday to Friday excluding public holidays.

### 3.2 PERMITS, FEES, AND NOTICES

- A. Unless otherwise provided in the Contract Documents, Contractor shall pay for and obtain all permits, licenses, and coordinate inspections necessary for proper execution and completion of the Work. Prior to final payment, the approved, signed permits shall be delivered to Owner.

### 3.3 PREVAILING WAGES

- A. Statutes of the State of Washington RCW 39.12 as amended shall apply to this contract. Requirements, in brief, are stated below:



# GENERAL CONDITIONS

1. There shall be paid each laborer or mechanic of the Contractor or sub-Contractor engaged in work on the project under this contract in the trade or occupation listed in the schedule of Wage Rates, as determined by the Department of Labor and Industries, not less than the hourly wage rate listed therein, regardless of any contractual relationship which may be alleged to exist between the Contractor and any sub-contractor and such laborers and mechanics.
2. The "prevailing rate or wage" contained in the wage determination include health and welfare fund contributions and other fringe benefits collectively bargained for by the various management and labor organizations. Prevailing wages shall be paid based on the most recent semi-annual list as required by the Department of Labor and Industries (L&I).
3. In case any dispute arises as to what are the prevailing rates for wages of work of a similar nature, and such disputes cannot be resolved by the parties involved, including labor and management representatives, the matter shall be referred for arbitration to the Director of the Department of Labor and Industries of the State of Washington, and the Director's decision shall be final and conclusive and binding on all parties involved in the dispute.

B. Before commencing the Work, Contractor shall file a statement of "Intent to Pay Prevailing Wages."

C. After completion of the Work, Contractor shall file an "Affidavit of Wages Paid."

## 3.4 EQUAL EMPLOYMENT OPPORTUNITY

A. During performance of the Work:

1. Contractor shall not discriminate against any employee or applicant for employment because of race, creed, color, national origin, sex, age, marital status, the presence of any physical, sensory, or mental disability, sexual orientation, Vietnam-era veteran status, disabled veteran status or political affiliation, nor commit any unfair practices as defined in RCW 49.60.
2. The Contractor shall take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, national origin, of any physical, sensory, or mental disability, sexual orientation, Vietnam-era veteran status, disabled veteran status, or political affiliation.
3. The Contractor shall give all notices and comply with all applicable laws, ordinances, rules, regulations and orders in regard to Equal Employment Opportunity including but not limited to Executive Order 11246, as amended, Section 503 of the Rehabilitation Act of 1973, as amended, and the rules, regulations, and orders of the Secretary of Labor. The Contractor shall include the terms of this Clause in every subcontract so that such term shall be binding on each Subcontractor.
4. Non-Discrimination R.C.W. 49.60: These special requirements establish minimum requirements for affirmative action and are intended to define and implement the basic discrimination provisions of these specifications. Failure to comply with these requirements may constitute grounds for application of contract default.

## 3.5 SAFETY PRECAUTIONS

A. In performing this contract, the Contractor shall provide for protecting the lives and health of employees and other persons; preventing damage to property, materials, supplies, and equipment; and avoid work interruptions. For these purposes, the Contractor shall:

1. Follow Washington Industrial Safety and Health Act (WISHA) regional directives and provide a site-specific safety program that will require an accident prevention and hazard analysis plan for the contractor and each subcontractor on the work site. The Contractor shall submit a site-specific safety plan to the Owner's representative prior to the initial scheduled construction meeting.
2. Provide adequate safety devices and measures including, but not limited to, the appropriate safety literature, notice, training, permits, placement and use of barricades, signs, signal lights, ladders, scaffolding, staging, runways, hoist, construction elevators, shoring, temporary lighting, grounded outlets, wiring, hazardous materials, vehicles, construction processes, and equipment required by Chapter 19.27 RCW, State Building Code (Uniform Building, Electrical, Mechanical, Fire, and Plumbing Codes); Chapter 212-12 WAC, Fire Marshal Standards, Chapter 49.17 RCW, WISHA; Chapter 296-155 WAC, Safety Standards for Construction Work; Chapter 296-65 WAC; WISHA Asbestos Standard; WAC 296-62-071, Respirator Standard; WAC 296-62, General Occupation Health Standards, WAC 296-24, General Safety and Health Standards, WAC 296-24, General Safety and Health Standards, Chapter 49.70 RCW, and Right to Know Act.

# GENERAL CONDITIONS

3. Comply with the State Environmental Policy Act (SEPA), Clean Air Act, Shoreline Management Act, and other applicable federal, state, and local statutes and regulations dealing with the prevention of environmental pollution and the preservation of public natural resources.
  4. Post all permits, notices, and/or approvals in a conspicuous location at the construction site.
  5. Provide any additional measures that the Owner determines to be reasonable and necessary for ensuring a safe environment in areas open to the public. Nothing in this part shall be construed as imposing a duty upon the Owner to prescribe safety conditions relating to employees, public, or agents of the Contractors.
- B. Contractor to maintain safety records: Contractor shall maintain an accurate record of exposure data on all incidents relating to the Work resulting in death, traumatic injury, occupational disease, or damage to property, materials, supplies, or equipment. Contractor shall immediately report any such incident to Owner. Owner shall, at all times, have a right of access to all records of exposure.
- C. Contractor to provide HazMat training: Contractor shall provide all persons working on the Project site with information and training on hazardous chemicals in their work at the time of their initial assignment, and whenever a new hazard is introduced into their work area.
1. Information. At a minimum, Contractor shall inform persons working on the Project site of:
    - a. WAC: The requirements of chapter 296-62 WAC, General Occupational Health Standards;
    - b. Presence of hazardous chemicals: Any operations in their work area where hazardous chemicals are present; and
    - c. Hazard communications program: The location and availability of written hazard communication programs, including the required list(s) of hazardous chemicals and material safety data sheets required by chapter 296-62 WAC.
  2. Training. At a minimum, Contractor shall provide training for persons working on the Project site which includes:
    - a. Detecting hazardous chemicals: Methods and observations that may be used to detect the presence or release of a hazardous chemical in the work area (such as monitoring conducted by the employer, continuous monitoring devices, visual appearance or odor of hazardous chemicals when being released, etc.);
    - b. Hazards of chemicals: The physical and health hazards of the chemicals in the work area;
    - c. Protection from hazards: The measures such persons can take to protect themselves from these hazards, including specific procedures Contractor, or its Subcontractors, or others have implemented to protect those on the Project site from exposure to hazardous chemicals, such as appropriate work practices, emergency procedures, and personal protective equipment to be used; and
    - d. Hazard communications program: The details of the hazard communications program developed by Contractor, or its Subcontractors, including an explanation of the labeling system and the material safety data sheet, and how employees can obtain and use the appropriate hazard information.
- D. Hazardous, toxic or harmful substances: Contractor's responsibility for hazardous, toxic, or harmful substances shall include the following duties:
1. Illegal use of dangerous substances: Contractor shall not keep, use, dispose, transport, generate, or sell on or about the Project site, any substances now or hereafter designated as, or which are subject to regulation as, hazardous, toxic, dangerous, or harmful by any federal, state or local law, regulation, statute or ordinance (hereinafter collectively referred to as "hazardous substances"), in violation of any such law, regulation, statute, or ordinance, but in no case shall any such hazardous substance be stored on the Project site.
  2. Contractor notifications of spills, failures, inspections, and fines: Contractor shall promptly notify Owner of all spills or releases of any hazardous substances which are otherwise required to be reported to any regulatory agency and pay the cost of cleanup. Contractor shall promptly notify Owner of all failures to comply with any federal, state, or local law, regulation, or ordinance; all inspections of the Project site by any regulatory entity concerning the same; all regulatory orders or fines; and all responses or interim cleanup actions taken by or proposed to be taken by any government entity or private party on the Project site.

# GENERAL CONDITIONS

- E. Public safety and traffic: All Work shall be performed with due regard for the safety of the public. Contractor shall perform the Work so as to cause a minimum of interruption of vehicular traffic or inconvenience to pedestrians. All arrangements to care for such traffic shall be Contractor's responsibilities. All expenses involved in the maintenance of traffic by way of detours shall be borne by Contractor.
- F. Contractor to act in an emergency: In an emergency affecting the safety of life or the Work or of adjoining property, Contractor is permitted to act, at its discretion, to prevent such threatened loss or injury, and Contractor shall so act if so authorized or instructed.
- G. No duty of safety by Owner: Nothing provided in this section shall be construed as imposing any duty upon Owner with regard to, or as constituting any express or implied assumption of control or responsibility over, Project site safety, or over any other safety conditions relating to employees or agents of Contractor or any of its Subcontractors, or the public.

## 3.6 INDEPENDENT CONTRACTOR

- A. The Contractor and Owner agree the Contractor is an independent contractor with respect to the services provided pursuant to this Contract. Nothing in this Contract shall be considered to create a relationship of employer and employee between the parties hereto. Neither the Contractor nor any employee of the Contractor shall be entitled to any benefits accorded Owner employees by virtue of the services provided under this Contract. The Owner shall not be responsible for withholding or otherwise deducting federal income tax or social security or contributing to the State Industrial Insurance Program, or otherwise assuming the duties of an employer with respect to the Contractor, or any employees of the Contractor.

## 3.7 OPERATIONS, MATERIAL HANDLING, AND STORAGE AREAS

- A. Contractor shall confine all operations, including storage of materials, to Owner-approved areas.
- B. Contractor shall be responsible for the proper care and protection of its materials and equipment delivered to the Project site.
- C. Contractor shall protect and be responsible for any damage or loss to the Work, or to the materials or equipment until the date of Final Acceptance, and shall repair or replace without cost to Owner any damage or loss that may occur.

## 3.8 PRIOR NOTICE OF EXCAVATION

- A. Prior to any excavation Contractor shall engage a locate service for all underground facilities or utilities. Contractor shall pay all fees for locator services and pay for all damages caused by excavation.

## 3.9 UNFORESEEN PHYSICAL CONDITIONS

- A. Notice requirement for concealed or unknown conditions: If Contractor encounters conditions at the site which are subsurface or otherwise concealed physical conditions which differ materially from those indicated in the Contract Documents, or unknown physical conditions of an unusual nature which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, then Contractor shall give written notice to Owner promptly and in no event later than seven Days after the first observance of the conditions. Conditions shall not be disturbed prior to such notice.
- B. Adjustment in Contract Time and Contract Sum: If such conditions differ materially and cause a change in Contractor's cost of, or time required for, performance of any part of the Work, the Contractor may be entitled to an equitable adjustment in the Contract Time or Contract Sum, or both, provided it makes a request therefore as provided in Part 5.

## 3.10 PROTECTION OF EXISTING STRUCTURES, EQUIPMENT, VEGETATION, UTILITIES, AND IMPROVEMENTS

# GENERAL CONDITIONS

- A. Contractor shall protect from damage all existing conditions, including soils, structures, equipment, improvements, utilities, and vegetation at or near the Project site; and on adjacent property of a third party, the locations of which are made known to or should be known by Contractor. Contractor shall repair any damage, including that to the property of a third party, resulting from failure to comply with the requirements of the Contract Documents, any defects of equipment, material, workmanship or design furnished by the Contractor, or failure by Contractor or subcontractor at any tier to exercise reasonable care in performing the Work. If Contractor fails or refuses to repair the damage promptly, Owner may have the necessary work performed and charge the cost to Contractor.
- B. New work which connects to existing work shall correspond in all respects with that to which it connects and/or be similar to existing work unless otherwise required by the Specifications.

## 3.11 MATERIAL AND EQUIPMENT

- A. All equipment, material, and articles incorporated into the Work shall be new and of the most suitable grade for the purpose intended, unless otherwise specifically provided in the Contract Documents. References in the Specifications to equipment, material, articles, or patented processes by trade name, make, or catalog number, shall be regarded as establishing a standard quality and shall not be construed as limiting competition. Contractor may, at its option, use any equipment, material, article, or process that, in the judgment of Owner, is equal to that named in the Specifications, unless otherwise specifically provided in the Contract Documents.
- B. Substitutions shall be considered where qualities and attributes including, but not limited to, cost, performance, weight, size, durability, visual effect, and specific features and requirements indicated are deemed equal or better by the Owner at the Owner's sole discretion. All requests for substitutions shall be made in writing to Owner and shall not be deemed to be approved unless approved in writing by Owner.

## 3.12 CORRECTION OF NONCONFORMING WORK

- A. Contractor shall promptly correct Work found by Owner not to conform to the requirements of the Contract Documents, whether observed before or after Final Acceptance.
- B. If Contractor fails to correct nonconforming Work, Owner may replace, correct, or remove the nonconforming Work and charge the cost thereof to the Contractor.

## 3.13 CLEAN UP

- A. Contractor shall at all times keep the Project site, including hauling routes, infrastructures, utilities, and storage areas, free from accumulations of waste materials. Before completing the Work, Contractor shall remove from the premises its rubbish, tools, scaffolding, equipment, and materials. Upon completing the Work, Contractor shall leave the Project site in a clean, neat, and orderly condition satisfactory to Owner. If Contractor fails to clean up as provided herein, and after reasonable notice from Owner, Owner may do so and the cost thereof shall be charged to Contractor.

## 3.14 SUBCONTRACTORS AND SUPPLIERS

- A. Contractor shall utilize Subcontractors and suppliers which are experienced and qualified.
- B. By appropriate written agreement, Contractor shall require each Subcontractor to be bound to Contractor by terms of those Contract Documents, and to assume toward Contractor all the obligations and responsibilities which Contractor assumes toward Owner in accordance with the Contract Documents. Each Subcontract shall preserve and protect the rights of Owner in accordance with the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights. Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. However, nothing in this paragraph shall be construed to alter the contractual relations between Contractor and its Subcontractors with respect to insurance or bonds.
- C. Contractor shall schedule, supervise, and coordinate the operations of all Subcontractors. No Subcontracting of any of the Work shall relieve Contractor from its responsibility for the performance of the Work in accordance with the Contract Documents or any other obligations of the Contract Documents.

# GENERAL CONDITIONS

- D. It is the Contractor's responsibility to pay its Subcontractors and material suppliers on a timely basis. The Owner reserves the right to withhold a portion of the Contractor's payment if the Contractor fails to make timely payments to the Subcontractors and material suppliers.
- E. The Contract Documents shall not be construed to create a contractual relationship of any kind between the Owner and any Subcontractor; or any persons other than Owner and Contractor.
- F. The Contractor shall not enter into any subcontract with any subcontractor who has been suspended or debarred from participating in contracting programs by any agency of the United States Government or by any state, territory, or municipality.

## 3.15 INDEMNIFICATION

- A. The Contractor hereby agrees to indemnify, defend, and hold harmless the Authority, its successors and assigns, director, officers, officials, employees, agents, partners and volunteers (all foregoing singly and collectively (Indemnities")) from a and against any and all claims, losses, harm costs, liabilities, damages and expenses, including, but not limited to, reasonable attorney's fees arising or resulting from the performance of the services, or the acts or omissions of the Contractor its successors, and assigns, employees, subcontractors or anyone acting on the contractor's behalf in connection with this Contract or its performance of this Contract.
- B. Provided, however, that the Contractor will not be required to indemnify, defend, or save harmless the indemnitee as provided in the preceding paragraphs of this section if the claim, suit, or action for injuries, death, or damages is caused by the sole negligence of the indemnitee. Where such claims, suites, or actions result from the concurrent negligence of (a) the indemnitee or the indemnitee's agents or employees and (b) the Contractor or the Contractor's agent or employee, the indemnity provisions provided in the proceeding paragraphs of this section shall be valid and enforceable only to the extent of the Contractor's negligence or the negligence of its agents and employees..
- C. The foregoing indemnity is specifically and expressly intended to constitute a waiver of the Contractor's immunity under Washington's Industrial Insurance act, RCW Title 51. The parties acknowledge that these provisions were specifically negotiated and agreed upon by them. If any portion of this indemnity clause is invalid or unenforceable, it shall be deemed excised and the remaining portions of the clause shall be given full force and effect.
- D. The Contractor hereby agrees to require all its Subcontractors or anyone acting under its direction or control or on its behalf in connection with or incidental to the performance of this Contract to execute an indemnity clause identical to the preceding clause, specifically naming the Owner as indemnity, and failure to do so shall constitute a material breach of this Contract by the Contractor.

## 3.16 PROHIBITION AGAINST LIENS

- A. The Contractor is prohibited from placing a lien on the Owner's property. This prohibition shall apply to all subcontractors of any tier and all materials suppliers, in accordance with RCW 35.82.190.

## 3.17 DAMAGES FOR FAILURE TO ACHIEVE TIMELY COMPLETION

- A. Liquidated Damages
  - 1. Timely performance and completion of the Work is essential to Owner and time limits stated in the Contract Documents are of the essence. The liquidated damage amounts set forth will be assessed not as a penalty, but as liquidated damages for breach of the Contract Documents. This amount is fixed and agreed upon by and between the Contractor and Owner because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages the Owner would in such event sustain. This amount shall be construed as the actual amount of damages sustained by the Owner, and may be retained by the Owner and deducted from any payments to the Contractor.
  - 2. If different completion dates are specified in the contract for separate parts or stages of the work, the amount of liquidated damages shall be assessed on those parts or stages which are delayed.

# GENERAL CONDITIONS

## 3.18 WAIVER AND SEVERABILITY

- A. The failure or delay of either party to insist on performance of any provision of the Contract, or to exercise any right or remedy available under the Contract, shall not be construed as a waiver of that provision, right, or remedy in any later instance. Waiver or breach of any provision of the Contract shall not be construed to be a waiver of any other or subsequent breach and shall not be construed to be a modification of the terms of the Contract, unless the Contract is modified pursuant to the Clause entitled "Contract Modifications" herein.
- B. If any provision of the Contract is or becomes void or unenforceable by operation of law, the remaining provisions shall be valid and enforceable.

## PART 4 - PAYMENTS AND COMPLETION

### 4.1 CONTRACT SUM

- A. The Contract Sum shall include all taxes imposed by law and properly chargeable to the Project, including sales tax. The Contractor shall pay the WSST to the Department of Revenue and shall furnish proof of payment to the Owner if requested.
- B. The retail sales tax does not apply to the gross contract price.
- C. Prime and subcontractors are required to pay retail sales tax upon all purchases of materials, including prefabricated and precast items, equipment, leases or rentals of tools, consumables, and other tangible personal property which is installed, applied, attached, or otherwise incorporated in their work.

### 4.2 APPLICATION FOR PAYMENT

- A. At monthly intervals, unless determined otherwise by Owner, Contractor shall submit to Owner an Application for Payment for Work completed in accordance with the Contract Documents. Each application shall be supported by such substantiating data as Owner may require.
- B. Each invoice shall include the following statement: "I hereby certify that the items listed are proper charges for materials, merchandise or services provided to the King County Housing Authority, and that all goods and/or services have been provided; that prevailing wages have been paid in accordance with the approved statements of intent filed with the Department of Labor and Industries; and that sub-contractors and/or suppliers have been paid, less earned retainage, as their interest appears in the last payment received."
- C. Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule. Each Application for Payment shall be consistent with previous applications and payments.
- D. Owner shall retain 5% of the amount of each progress payment until 45 Days after Final Acceptance and receipt of all documents required by law or the Contract Documents including releases by Washington State Employment Security Department and Washington State Department of Revenue and Department of Labor & Industries.
- E. Waivers of Lien: With each Application for Payment, submit conditional waivers lien from every entity who is lawfully entitled to file a lien arising out of the Contract and related to the Work covered by the payment.
  - 1. Submit partial waivers on each item for amount requested, before deduction for retainage, on each item.
  - 2. When an application shows completion of an item, submit final or full waivers.
  - 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
    - a. Submit final Application for Payment with or preceded by final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
- F. Final Payment Application: Submit final Application for Payment with releases and close out supporting documentation.

# GENERAL CONDITIONS

- G. Approved payments shall be mailed to the Contractor within 30 days.

## 4.3 FINAL COMPLETION, ACCEPTANCE, AND PAYMENT

- A. The Owner shall make a final inspection of the Work on receipt of (1) written notice from the Contractor that the Work is ready for final inspection and (2) a final Application for Payment. When the Owner finds the Work acceptable and fully performed under the Contract Documents, and the Contractor has delivered to the Owner all warranties, permits, and operations manuals, the Owner will issue a Notice of Final Completion.
- B. Acceptance of final payment by Contractor, or any Subcontractor, shall constitute a waiver and release to Owner of all claims by Contractor, or any such Subcontractor, for an increase in the Contract Sum or the Contract Time, and for every act or omission of Owner relating to or arising out of the Work, except for those Claims made in accordance with the procedures, including the time limits, set forth in PART 7 - .

## PART 5 - CHANGES

### 5.1 CHANGE IN THE WORK

- A. Owner may, at any time and without notice to Contractor's surety, order additions, deletions, revisions, or other changes in the Work. These changes in the Work shall be incorporated into the Contract Documents through the execution of Change Orders. If any change in the Work ordered by Owner causes an increase or decrease in the Contract Sum or the Contract Time, an equitable adjustment shall be made as provided in 5.2 and 5.3.
- B. Pending agreement on the terms of the Change Order, Owner may direct Contractor to proceed immediately with the Change Order Work. Contractor shall not proceed with any change in the Work until it has obtained Owner's written approval.
- C. The Contractor agrees that any change in the Contract Amount or Contract Time provided in a Change Order is full and complete compensation to the Contractor for the change(s) to the work, deleted work, modified work, direct or indirect impact on the Contractor's schedule, and for any equitable adjustment or time extension to which the Contractor may be entitled to in the Change Order, pursuant to the Contract between the Owner and Contractor.

### 5.2 CHANGE IN THE CONTRACT SUM

- A. Change Order Pricing - Fixed Price: When the fixed price or time and materials method is used to determine the value of any Work covered by a Change Order, or of a request for an equitable adjustment in the Contract Sum, the following procedures shall apply:
  - 1. Contractor's Change Order proposal, or request for adjustment in the Contract Sum, shall be accompanied by a complete itemization of the costs, including labor, material, subcontractor costs, and overhead and profit. The costs shall be itemized in the manner set forth below, and shall be submitted on breakdown sheets with documentation in a form approved by Owner.
  - 2. Any request for adjustment of Contract Sum shall include only the following items:
    - a. Craft labor costs for Contractors and Subcontractors.
      - 1) Basic wages and benefits: Hourly rates and benefits according to applicable prevailing wages.
      - 2) Direct supervision shall not to exceed 15% of the cost of direct labor. No supervision markup shall be allowed for a working supervisor's hours.
      - 3) Worker's Insurance. Direct contributions to the State for industrial insurance, medical aid, and supplemental pension by the class and rates established by L&I.
      - 4) Federal Insurance. Direct contributions required by the Federal Insurance Compensation Act; Federal Unemployment Tax Act; and the State Unemployment Compensation Act.
      - 5) Safety and small tools: 4% of the sum of the amounts calculated in (1), (2), and (3) above.

# GENERAL CONDITIONS

- b. Material Costs: Material costs and applicable sales tax shall be developed from actual known costs, supplier quotations or standard industry pricing guides and shall consider all available discounts. Freight costs, express charges, or special delivery charges shall be itemized.
- c. Equipment Costs: Itemization of the type of equipment and the estimated or actual length of time the equipment appropriate for the Work is or will be used on the change in the Work. Costs will be allowed for equipment and applicable sales tax only if used solely for the changed Work, or for additional rental costs actually incurred by the Contractor. The Date Quest Rental Rate (Blue Book) shall be used as a basis for establishing rental rates of equipment not listed in the above sources. The maximum rate for standby equipment shall not exceed 50% of the applicable rate.
- d. Allowance for Overhead: This allowance shall compensate Contractor for all noncraft labor, temporary construction facilities, field engineering, schedule updating, as-built drawings, home office cost, B&O taxes, office engineering, estimating costs, additional overhead because of extended time and any other cost incidental to the change in the Work. This allowance shall be strictly limited in all cases an amount not to exceed the following:
  - 1) For Contractor, for any Work actually performed by Contractor's own forces, 16% of the cost.
  - 2) For each Subcontractor (including lower tier subcontractors), for any Work actually performed by its own forces, 16% of the cost.
  - 3) For Contractor, for any Work performed by its Subcontractor(s), 6% of the amount due each Subcontractor.
  - 4) For each Subcontractor, for any Work performed by its Subcontractor(s) of any lower tier, 5% of the amount due the sub-Subcontractor.
- e. Allowance for Profit:
  - 1) For Contractor or Subcontractor of any tier for work performed by their forces, 5% of the cost developed in accordance with subsections a, b & c above.
  - 2) For Contractor or Subcontractor of any tier for work performed by a subcontractor of a lower tier, 5% of the Subcontractor cost.
- f. Insurance or Premium: The costs of any change or additional premium of Contractor's liability insurance or bond premium arising directly from the changed Work. The costs of any change in insurance shall be added after overhead and profit are calculated.

## B. Change Order Pricing - Unit Prices

- 1. Work on a unit-price basis as stated in the Specifications and at the price submitted in the Bid Form or as subsequently modified.
  - a. Unit prices shall include reimbursement for all direct and indirect costs of the Work, including overhead and profit, bond premium, and insurance costs; and
  - b. Quantities must be supported by field measurement verified by Owner.

## 5.3 CHANGE IN THE CONTRACT TIME

- A. The Contract Time shall only be changed by a Change Order. Contractor shall immediately notify Owner, and shall include any request for a change in the Contract Time in its Change Order proposal.
- B. If the time of Contractor's performance is changed due to an act of Force Majeure, Contractor shall request for an equitable adjustment in the Contract Time in writing within 24-hours of the occurrence.

## PART 6 - CLAIMS AND DISPUTE RESOLUTION

### 6.1 CLAIMS PROCEDURE

- A. If the parties fail to reach agreement regarding any dispute arising from the Contract Documents, Contractor's only remedy shall be to file a Claim with Owner within 30 Days from Owner's final offer.



# GENERAL CONDITIONS

- B. The Claim shall be deemed to cover all changes in cost and time (including direct, indirect, impact, and consequential) to which Contractor may be entitled. It shall be fully substantiated and documented.
- C. After Contractor has submitted a fully-documented Claim, Owner shall respond, in writing, to Contractor with a decision within 30 Days from the date the Claim is received.
- D. Contractor shall proceed with performance of the Work pending final resolution of any Claim. Owner's written decision as set forth above shall be final and conclusive as to all matters set forth in the Claim.
- E. Any Claim of the Contractor against the Owner for damages, additional compensation, or additional time, shall be conclusively deemed to have been waived by the Contractor unless timely made in accordance with the requirements of this section.

## 6.2 ARBITRATION

- A. If Contractor disagrees with Owner's decision rendered in accordance with paragraph 6.1C, Contractor shall provide Owner with a written demand for arbitration. No demand for arbitration of any such Claim shall be made later than 30 Days after the date of Owner's decision on such Claim; failure to demand arbitration within said 30 Day period shall result in Owner's decision being final and binding upon Contractor and its Subcontractors.
  - 1. Notice of the demand for arbitration shall be filed with the American Arbitration Association (AAA), with a copy provided to Owner. The parties shall negotiate or mediate under the Voluntary Construction Mediation Rules of the AAA, or mutually acceptable service.
- B. All Claims arising out of the Work shall be resolved by arbitration. The judgment upon the arbitration award may be entered, or review of the award may occur, in the superior court having jurisdiction thereof. No independent legal action relating to or arising from the Work shall be maintained.

## 6.3 CLAIMS AUDITS

- A. All Claims filed against Owner shall be subject to audit at any time following the filing of the Claim. Failure of Contractor, or Subcontractors of any tier, to maintain and retain sufficient records to allow Owner to verify all or a portion of the Claim or to permit Owner access to the books and records of Contractor, or Subcontractors of any tier, shall constitute a waiver of the Claim and shall bar any recovery.
  - 1. In support of Owner audit of any Claim, Contractor shall promptly make available to Owner all records relating to the Work.

## PART 7 - TERMINATION OF THE WORK

### 7.1 TERMINATION BY OWNER FOR CAUSE

- A. Owner may, upon a written Notice to Contractor and to its surety, terminate (without prejudice to any right or remedy of Owner) the Work, or any part of it, for cause upon the occurrence of any one or more of the following events:
  - 1. Contractor fails to prosecute the Work or any portion thereof with sufficient diligence to ensure Completion of the Work within the Contract Time;
  - 2. Contractor is adjudged bankrupt, makes a general assignment for the benefit of its creditors, or a receiver is appointed on account of its insolvency;
  - 3. Contractor fails in a material way to replace or correct Work not in conformance with the Contract Documents;
  - 4. Contractor repeatedly fails to supply skilled workers or proper materials or equipment;
  - 5. Contractor repeatedly fails to make prompt payment due to Subcontractors, suppliers, or for labor;
  - 6. Contractor materially disregards or fails to comply with laws, ordinances, rules, regulations, or orders of any public authority having jurisdiction; or
  - 7. Contractor is otherwise in material breach of any provision of the Contract Documents.

# GENERAL CONDITIONS

- B. Upon termination, Owner may at its option:
  - 1. Take possession of the Project site and take possession of or use all materials, equipment, tools, and construction equipment and machinery thereon owned by Contractor to maintain the orderly progress of, and to finish, the Work;
  - 2. Finish the Work by whatever other reasonable method it deems expedient.
- C. Owner's rights and duties upon termination are subject to the prior rights and duties of the surety, if any, obligated under any bond provided in accordance with the Contract Documents.
- D. When Owner terminates the Work in accordance with this section, Contractor shall take the actions set forth in paragraph 7.2B, and shall not be entitled to receive further payment until the Work is accepted.
- E. If the unpaid balance of the Contract Sum exceeds the cost of finishing the Work, including compensation for A/E services and expenses made necessary thereby and any other extra costs or damages incurred by Owner in completing the Work, or as a result of Contractor's actions, such excess shall be paid to Contractor. If such costs exceed the unpaid balance, Contractor shall pay the difference to Owner. Contractor shall also be liable for liquidated damages until such reasonable time as may be required for Completion. These obligations for payment shall survive termination.
- F. Termination of the Work in accordance with this section shall not relieve Contractor or its surety of any responsibilities for Work performed.
- G. If Owner terminates Contractor for cause, and it is later determined that none of the circumstances set forth in 7.1A exist, then such termination shall be deemed a termination for convenience pursuant to 7.2.

## 7.2 TERMINATION BY OWNER FOR CONVENIENCE

- A. Owner may, upon Notice, terminate (without prejudice to any right or remedy of Owner) the Work, or any part of it, for the convenience of Owner.
- B. Unless Owner directs otherwise, after receipt of a Notice of termination for either cause or convenience, Contractor shall promptly:
  - 1. Stop performing Work on the date and as specified in the notice of termination;
  - 2. Place no further orders or subcontracts for materials, equipment, services or facilities, except as may be necessary for completion of such portion of the Work as is not terminated;
  - 3. Cancel all orders and subcontracts, upon terms acceptable to Owner, to the extent that they relate to the performance of Work terminated;

## PART 8 - MISCELLANEOUS PROVISIONS

### 8.1 RECORDS KEEPING AND REPORTING

- A. The Contractor and all Subcontractors shall maintain accounts and records in accordance with State Auditor's procedures, including personnel, property, financial and programmatic records which sufficiently and properly reflect all direct and indirect costs of any nature expended and services performed in the performance of this Contract and other such records as may be deemed necessary by the Owner to ensure proper accounting for all funds contributed by the Owner to the performance of this Contract and compliance with this Contract.
- B. The Contractor, and its Subcontractors, shall maintain these records for a period of six (6) years after the date of Final Acceptance.

### 8.2 AUDITS AND INSPECTIONS

- A. The records and documents with respect to all matters covered by this Contract shall be subject at all times to inspection, review or audit by the Owner or any other government agency so authorized by law during the performance of this Contract. The Owner shall have the right to an annual audit of the Contractor's financial statement and condition.

# GENERAL CONDITIONS

## 8.3 ORGANIZATION CONFLICTS OF INTEREST

- A. The Contractor warrants that to the best of its knowledge and belief and except as otherwise disclosed, it does not have any organizational conflict of interest which is defined as a situation in which the nature of work under this Contract and the Contractor's organizational, financial, contractual or other interests are such that:
  - 1. Award of the Contract may result in an unfair competitive advantage; or
  - 2. The Contractor's objectivity in performing the Contract work may be impaired.
- B. The Contractor agrees that if after award they discover an organizational conflict of interest with respect to this Contract, they shall make an immediate and full disclosure in writing to the Contracting Officer, which shall include a description of the action, which the Contractor has taken or intends to take to eliminate or neutralize the conflict. The Owner may, however, terminate the Contract if it deems the action to be in the best interest of the Owner.
- C. In the event the Contractor was aware of an organizational conflict of interest before the award of this Contract and intentionally did not disclose the conflict to the Contracting Officer, the Owner may terminate the Contract for default.
- D. The provisions of this Clause shall be included in all subcontracts and consulting agreements wherein the work to be performed is similar to the services provided by the Contractor. The Contractor shall include in such subcontracts and consulting agreements any necessary provisions to eliminate or neutralize conflicts of interest.

## 8.4 INTERESTS OF MEMBERS OF CONGRESS

- A. No member of or delegate to the Congress of the United States of America shall be admitted to any share or part of this Contract or to any benefit to arise therefrom, but this provision shall not be construed to extend to this Contract if made with a corporation for its general benefit.

## 8.5 INTERESTS OF MEMBERS, OFFICERS, COMMISSIONERS AND EMPLOYEES, OR FORMER MEMBERS, OFFICERS AND EMPLOYEES

- A. No member, officer, or employee of the King County Housing Authority, no member of the governing body of the locality in which the project is situated, no member of the governing body in which the Owner was activated, and no other public official or such locality or localities who exercises any functions or responsibilities with respect to the project, shall, during his or her tenure, or for one year thereafter, have any interest, direct or indirect, in this Contract or the proceeds thereof.

# BID FORM

**PROJECT NAME AND LOCATION:**

**Office Flat Roof Replacement REBID  
Cove East Apartments**

**Contract Number: DW2302531**

The undersigned, Legal Name of Bidder: \_\_\_\_\_

on this date: \_\_\_\_\_, 2023, having familiarized him/herself with the contract documents, site conditions, and has field verified all measurements contained in the project manual as prepared by the Owner, hereby proposes to furnish labor, materials and necessary equipment – all including, but not limited to, demolition, disposal, new installation and the required applicable taxes and fees to complete the work for the following bid amounts:

**BASE BID** \_\_\_\_\_ (\$ \_\_\_\_\_)  
(Including sales tax indicated in Instructions to Bidders)

**UNIT PRICES See Specification Section 01100, 1.7 – Unit Prices**

**Unit Price No. 1** \_\_\_\_\_ (\$ \_\_\_\_\_)  
Roof Framing (Including sales tax indicated in Instructions to Bidders)

**Unit Price No. 2** \_\_\_\_\_ (\$ \_\_\_\_\_)  
Fascia Board (Including sales tax indicated in Instructions to Bidders)

**ADDENDA** \_\_\_\_\_  
Acknowledge receipt of any addenda by inserting the number(s) above

In submitting this bid, it is understood that the right is reserved by the Owner to reject any and all bids. The undersigned hereby agrees that this proposal shall be a valid and firm offer for a period of Sixty (60) calendar days from the date of Bid Opening.

Bidder agrees that Work will be substantially complete and ready for final payment in accordance with the Contract Documents on or before the date, within the number of calendar days indicated.

The undersigned Bidder hereby certifies that, within the three-year period immediately preceding the bid solicitation date for this Project, the bidder is not a “willful” violator, as defined in RCW 49.48.082, of any provision of chapters 49.46, 49.48, or 49.52 RCW, as determined by a final and binding citation and notice of assessment issued by the Department of Labor and Industries or through a civil judgment entered by a court of limited or general jurisdiction.

I certify (or declare) under penalty of perjury under the laws of the State of Washington that the foregoing is true and correct.

\_\_\_\_\_  
Signature of Bidder

\_\_\_\_\_  
Print Your Name

Submitted on \_\_\_\_\_ day of \_\_\_\_\_ 2023

\_\_\_\_\_  
City

\_\_\_\_\_  
State

# BIDDER INFORMATION

## BIDDER INFORMATION

Name of Bidder (Company): \_\_\_\_\_

Address: \_\_\_\_\_

Contact Name: \_\_\_\_\_

Phone Number: \_\_\_\_\_ Email Address: \_\_\_\_\_

Business Type: General Contractor ( ) Other ( ) (Please specify): \_\_\_\_\_

Bidder is a(n):  Individual  Partnership  Joint Venture  Incorporated in the state of \_\_\_\_\_

List business names & associated UBI # used by Bidder during the past 5 years if different than above:

\_\_\_\_\_

Bidder has been in business continuously from: \_\_\_\_\_  
*Month, Year*

Business License #: \_\_\_\_\_ Federal ID #: \_\_\_\_\_

Current UBI #: \_\_\_\_\_ Dept. of L&I Worker's Comp. Acct. #: \_\_\_\_\_

Bidder has experience in work "Similar in Scope and Complexity" comparable to that required for this Project:

As a prime contractor for \_\_\_\_\_ years. As a subcontractor for \_\_\_\_\_ years.

OWNER(S) OF COMPANY (List <b>all</b> owners):	OWNER'S SOCIAL SECURITY NUMBER (only required if sole proprietorship):

No. of regular full-time employees other than owner(s): \_\_\_\_\_

Indicate clearly the kind of work your company will actually perform in this project:

\_\_\_\_\_

Approximate % of work your company will actually perform: \_\_\_\_\_

List the supervisory personnel to be employed by the Bidder and available for, and intended to, work on this project:

<u>Name</u>	<u>Title</u>	<u>How Long With Bidder</u>

# BIDDER INFORMATION

## SUBCONTRACTORS

Do you intend to use Subcontractor(s) in this project? Yes  No  (If yes, you must show the name of the subcontractors. Attach additional pages as necessary.)

Subcontractors Name	Subcontractor's UBI#	Phone Number	Trade	Years in Business
1.				
2.				
3.				
4.				
5.				

## BIDDER'S EXPERIENCE

Projects successfully supervised and completed by your company for work of similar scope and value as specified in bid documents in the last 5 years. Attach additional pages as necessary.

Name of Project	Completion Date	Duration (Months)	Nature of Work	Amount of Contract
1.				
2.				
3.				
4.				
5.				

Owner's Name (of project listed above)	Project Address	Contact Person	Phone Number
1.			
2.			
3.			
4.			
5.			

Has Bidder ever been found guilty of violating any State or Federal employment laws?  No  Yes  
If yes, give details & attach additional pages as necessary:

Has Bidder ever filed for protection under any provision of the federal bankruptcy laws or state insolvency laws?  
 No  Yes If yes, give details & attach additional pages as necessary:

## BIDDER INFORMATION

Has any lien, claim and/or adverse legal action related to construction been rendered against Bidder in the past five years? (i.e., open claims, lawsuits, warrants, judgements including but not limited to those that would show on the L&I website)  No  Yes If yes, give details & attach additional pages as necessary:

Has Bidder or any of its employees filed any claims with Washington State Worker's Compensation or other insurance company for accidents resulting in fatal injury or dismemberment in the past 5 years?  No  Yes  
If yes, please state:

<u>Date</u>	<u>Type of Injury</u>	<u>Agency Receiving Claim</u>
_____	_____	_____
_____	_____	_____

Bidders current Experience Modification Rate (EMR): \_\_\_\_\_

*(If Bidder is self-insured, attach proof of EMR stated, showing complete worksheet calculations)*

The bidder hereby certifies that the information contained in this Bidder's Information is accurate, complete and current.

BY: \_\_\_\_\_ NAME: \_\_\_\_\_  
(signature) (print)

TITLE: \_\_\_\_\_ DATE: \_\_\_\_\_

# CONTRACT FORM

This Contract is entered into by and between the King County Housing Authority, hereinafter referred to as the "Owner" whose principal office is located at 600 Andover Park West, Seattle, WA 98188 and [Name of Contractor], referred to as the "Contractor", whose principal office is located at [Contractor's Address].

**IN CONSIDERATION OF** the mutual benefits and conditions hereinafter contained, the parties hereto agree as follows:

1.1 Contract Documents

A. The provisions set forth in the Contract Documents are hereby incorporated into and made part of the Contract. Contractor acknowledges receipt and review of all Contract Documents applicable to performance of the work. The Contract shall consist of the following component parts:

1. This Instrument
2. Addenda
3. Specifications
4. Plans
5. Bid Form
6. Pre-Bid Agenda
7. General Conditions
8. Instructions to Bidders
9. Prevailing Wage Rates

1.2 Scope of Services to be Performed by the Contractor: The Contractor shall provide all labor, materials, tools, equipment, transportation, supplies, and incidentals required to complete the work in accordance with the Contract Documents for:

Project: Cove East Apartments Office Flat Roof Replacement

Contract No.: DW2302531

1.3 Compensation: The total amount of the Contract shall be [\$\$\$] dollars and [¢¢] cents (\$[\$\$\$.\$\$]) subject to additions and deductions provided therein.

1.4 Duration of Contract: The Contractor shall commence work after receipt of Notice to Proceed, follow the schedule specified in the contract documents, and all work must be completed within thirty (30) consecutive calendar days from the date of the Notice to Proceed unless sooner terminated pursuant to the General Conditions. Upon expiration of the original Contract term, the Contract, at the Owner's sole discretion, may be extended for a period determined by the Owner.

1.5 Liquidated Damages: Timely performance and completion of the Work is essential to Owner and time limits stated in the Contract Documents are of the essence. If Completion of the Work does not occur within the Contract Time, the Contractor agrees that Liquidated Damages in the amount of **\$250.00** per day will be assessed for each calendar day that the Contractor exceeds the time for completion.

The individuals signing this Contract warrant and represent for themselves and for their respective organizations that they are duly authorized to sign this Contract and that upon such signing their respective organizations are bound thereby.

DATED this \_\_\_\_\_ day of \_\_\_\_\_, 2023

Contractor

Owner

\_\_\_\_\_  
President/Owner

\_\_\_\_\_  
Dan Watson  
Advisor to the Executive Director  
KING COUNTY HOUSING AUTHORITY



# CERTIFICATE OF INSURANCE

DATE(MM/DD/YY)

**Issue Date**

<b>PRODUCER</b> <b>Vendor's Insurance Agent</b> <b>Street Address</b> <b>City, State, Zip</b> <b>Phone Number</b>	<b>THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.</b>
---	--

<b>COMPANIES AFFORDING COVERAGE</b>	
COMPANY <b>A</b>	<b>ABC Insurance Company</b>

<b>INSURED</b> <b>Vendor Name</b> <b>Street Address</b> <b>City, State, Zip</b>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%; text-align: center;">COMPANY <b>B</b></td> <td><b>DEF Insurance Company</b></td> </tr> <tr> <td style="text-align: center;">COMPANY <b>C</b></td> <td><b>GHI Insurance Company</b></td> </tr> <tr> <td style="text-align: center;">COMPANY <b>D</b></td> <td></td> </tr> </table>	COMPANY <b>B</b>	<b>DEF Insurance Company</b>	COMPANY <b>C</b>	<b>GHI Insurance Company</b>	COMPANY <b>D</b>	
COMPANY <b>B</b>	<b>DEF Insurance Company</b>						
COMPANY <b>C</b>	<b>GHI Insurance Company</b>						
COMPANY <b>D</b>							

**COVERAGES**  
 THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

CO LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIMITS	
<b>A</b>	<b>GENERAL LIABILITY</b>	<b>XXX123</b>	<b>01/01/00</b>	<b>01/01/01</b>	GENERAL AGGREGATE	<b>2,000,000</b>
	<input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY				PRODUCTS-COMP/OP AGG	<b>1,000,000</b>
	<input type="checkbox"/> CLAIMS MADE <input checked="" type="checkbox"/> OCCUR				PERSONAL & ADV INJURY	<b>1,000,000</b>
	<input type="checkbox"/> OWNER'S & CONTRACTOR'S PROT				EACH OCCURRENCE	<b>1,000,000</b>
					FIRE DAMAGE (Any one fire)	<b>50,000</b>
					MED EXP (Any one person)	<b>5,000</b>
<b>B</b>	<b>AUTOMOBILE LIABILITY</b>	<b>XXX456</b>	<b>01/01/00</b>	<b>01/01/01</b>	COMBINED SINGLE LIMIT	<b>1,000,000</b>
	<input checked="" type="checkbox"/> ANY AUTO				BODILY INJURY (Per person)	
	<input type="checkbox"/> ALL OWNED AUTOS				BODILY INJURY (Per accident)	
	<input type="checkbox"/> SCHEDULED AUTOS				PROPERTY DAMAGE	
<input checked="" type="checkbox"/> HIRED AUTOS						
<input type="checkbox"/> NON-OWNED AUTOS						
	<b>GARAGE LIABILITY</b>				AUTO ONLY-EA ACCIDENT	
	<input type="checkbox"/> ANY AUTO				OTHER THAN AUTO ONLY:	
					EACH ACCIDENT	
					AGGREGATE	
	<b>EXCESS LIABILITY</b>				EACH OCCURRENCE	
	<input type="checkbox"/> UMBRELLA FORM				AGGREGATE	
	<input type="checkbox"/> OTHER THAN UMBRELLA FORM					
<b>C</b>	<b>WORKERS' COMPENSATION AND EMPLOYER'S LIABILITY</b>	<b>XXX789</b>	<b>01/01/00</b>	<b>01/01/01</b>	<input checked="" type="checkbox"/> STATUTORY LIMITS	
	<input type="checkbox"/> THE PROPRIETOR/PARTNERS/EXECUTIVE OFFICERS ARE:				EACH ACCIDENT	<b>1,000,000</b>
	<input type="checkbox"/> INCL <input type="checkbox"/> EXCL				DISEASE-POLICY LIMIT	<b>1,000,000</b>
					DISEASE-EACH EMPLOYEE	<b>1,000,000</b>
	<b>OTHER</b>					

**DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/SPECIAL ITEMS**  
**Coast Property Management and King County Housing Authority are named as additional insureds with respect to above general liability and auto coverage. Re: Work at Cove East Apartments, 33030 1st Ave S., Federal Way, WA 98003. Contract: DW2302531**

<b>CERTIFICATE HOLDER</b> <b>Coast Property Management &amp; King County Housing Authority 600 Andover Park West Seattle, WA 98188-3326</b>	<b>CANCELLATION</b> SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING COMPANY WILL ENDEAVOR TO MAIL <b>30</b> DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO MAIL SUCH NOTICE SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE COMPANY, ITS AGENTS OR REPRESENTATIVES. <b>AUTHORIZED REPRESENTATIVE</b> Signature of Insured's Agent
--	---

**PROVIDE**

**GENERAL LIABILITY  
ENDORSEMENT**

**and**

**AUTO LIABILITY  
ENDORSEMENT**



30620 Pacific Hwy S, #103,  
Federal Way, WA 98003  
(253) 941-4343



Attn: Puget Sound Abatement

Enclosed please find the analytical report for one or more samples submitted for analysis by Polarized Light Microscopy.

**The six types of asbestos fibers are chrysotile, amosite, crocidolite, tremolite, anthophyllite and actinolite. A sample which contains more than 1% asbestos is considered positive and is defined by the EPA as an Asbestos Containing Material (ACM).**

The samples were analyzed in accordance with EPA method 600/R-93/116 and 600/M4-82-020. The analyst used a stereomicroscope to visually inspect the sample to determine homogeneity and material descriptions. The sample was then viewed under a polarized light microscope to determine the presence and percentage of asbestos and non-asbestos fibers.

After analysis is complete, all paperwork will be filed together, and kept in a secure locked filing cabinet away from other clients and laboratory staff. Asbestos Northwest ensures that the files will not be tampered with at any time, and will be removed from the filing cabinet only if the client requests a modification on the report or reanalysis. If you have any concerns or comments, contact us at [feedback@asbestosnw.com](mailto:feedback@asbestosnw.com) or fill out our survey at [asbestosnw.com/survey](http://asbestosnw.com/survey)

Thank you,

-These results are only applicable to the **samples enclosed**, and may not be reproduced, except in full, without the approval of the laboratory. This report may not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.-



30620 Pacific Hwy S. #103, Federal Way, WA 98003  
 (253) 941-4343 NVLAP Lab Code: 200993-0

**Bulk Samples Chain of Custody (EPA 600/R-93/116)**

Name/Company: POCKET SOUND APARTMENT Date: 10/9/2020  
 Address: 27000 LIND AVE SW Phone: 425 757 6874  
RENTON, WA 98057 E-mail:  
 Project Manager: Rak Project # EAST COVE  
 Project Location: 33030 1st AVE S Number of Samples: 2  
FEDERAL WAY WA Turn around time: 24 Hour

#	Sample ID	Description	Location/Comments
1	01-001	ROOF SHINGLE w/ MASTIC	OFFICE
2	01-002	"	"
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
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22			
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24			
25			
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27			
28			
29			
30			

	Print	Sign	Company	Date	Time
Sampled by:	Rak, ERIC		BSA	10/9	
Relinquished by:	Rak, ERIC		BSA	10/9	
Delivered by:	Rak, ERIC		BSA	10/9	
Accepted by:	Crystal Andrzejewicz		Asbestos Northwest	10/9/20	10 Am
Analyzed by:	GUY BUTLER		ANW	10-9-20	



Asbestos Northwest, LLC  
 30620 Pacific Hwy S, #103, Federal Way, WA 98003  
 Ph: (253) 941-4343 Fax: (253) 941-4175



**Batch Number: 202014127**

**PLM Analysis by EPA Method 600/M4-82-020 and 600/R-93/116**

This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

**Attn: Eric Rock**  
**Puget Sound Abatement**  
**2701 Lind Ave SW Suite #200, Renton WA**  
**98057**

**Date Received: 10/9/2020**  
**Date Analyzed: 10/9/2020**  
**Samples Received: 2**  
**Samples Analyzed: 2**

**Project: East Cove**  
**Location: 33030 1st Ave S Federal Way, WA**

Client Sample ID	Lab Sample ID	Layer	Description	Matrix	% Non-Asbestos Fibers	% Asbestos Fibers and Type
01-001		1	Black asphaltic material with sand	Asphalt/binder, Sand	50% Cellulose, Glass fibers, Polyethylene	<b>None Detected</b>
		1	Black asphaltic material	Asphalt/binder	3% Cellulose, Glass fibers, Polyethylene	<b>None Detected</b>
01-002		1	Black asphaltic material with sand	Asphalt/binder, Sand	50% Cellulose, Glass fibers, Polyethylene	<b>None Detected</b>
		1	Black asphaltic material	Asphalt/binder	3% Cellulose, Glass fibers, Polyethylene	<b>None Detected</b>

Analyzed by: Cathy Butler *Cathy Butler*