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Polyvinyl-Chloride (PVC) Roofing

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A. General:

1. Ball State University has established a standard roofing system that should be used on all new projects, unless specific deviations are approved by the Owner or a different system is required to match another existing system. System manufacturers shall be limited to those listed.

B. Quality Assurance:

1. Installer Qualifications:

- a. Installer shall be approved, authorized, certified, or licensed by the roofing system manufacturer to install manufacturer's product and is eligible to receive standard and special warranties and is eligible to perform manufacturer's warranty work.
- b. Installer's Job Site Foreman shall be present at all times when Work is being performed.
- c. Installer's Job Site Foreman and roofing mechanics shall be specifically trained by the roofing manufacturer in the installation of the roofing system specified and shall carry certification cards attesting to training.
- d. Installer shall be pre-qualified according to Owner provided criteria.

2. Manufacturer's Field Services:

- a. Engage a manufacturer's representative to observe and inspect the Work. Manufacturer's representative's services include examination of substrates and conditions, verification of materials, inspection of completed portions of the Work, and submittal of written reports. Manufacturer's published minimum standards are required but do not supersede any or all higher standards called out in these specifications. Manufacturer's field services inspectors have no authority to change any specified standard without written approval of the Architect.
- b. Manufacturer's field services inspectors may NOT approve a roof installation as warrantable or acceptable if any current condition of the application of the new system does not meet the current published Manufacturer's standards regardless of any verbal acceptance that conflicts with the actual published standard. The Owner & Owner's representative reserve the right to be the final authority on this issue.

3. Source Limitations: Provide components, including roof insulation, fasteners, pre-molded flashings, and adhesives approved and warranted by the membrane roofing manufacturer for the roofing system specified.



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C. Warranty:

1. Provide 20 year total system warranty, without monetary limit (i.e., no-dollar limit), covering repair or replacement of membrane roofing, base flashings, weldable metal roofing accessories, anchor plates, roof insulation, fasteners, cover boards, substrate boards, and other roofing system components that fail in materials or workmanship during the warranty period. Provide wind uplift coverage up to 74 mph, minimum, or the wind uplift rating specified for the roof.
2. Provide 2-year total system installation warranty by the roofing installer covering repair or replacement of membrane roofing, base flashings, weldable metal roofing accessories, anchor plates, roof insulation, anchor plates, fasteners, cover boards, substrate boards, and other roofing system components that fail in materials or workmanship during the warranty period.
3. Failure includes roof leaks and wet insulation, and fastener failures.

D. Performance Requirements:

1. FM Global Design Requirements: Provide system complying with FM Global "RoofNav" for building location, exposure and height and approval under FM Global 4470. Roofing system design and details shall comply with the requirements of Loss Prevention Data Sheets 1-28, 1-29, and 1-49.
2. Membrane Performance:
 - a. Fire Resistance: ASTM E108, Class A
 - b. Accelerated Weathering: Minimum 10,000 hours of exposure when tested according to ASTM G152, G154, or G155.
 - c. Impact Resistance: Pass ASTM D5635.
 - d. Hail Resistance Rating: FM Global SH
 - e. Solar Reflectance Index: For white membranes, 3-year solar reflectance index not less than 78 calculated according to ASTM E1980, based on testing of identical products by a qualified testing agency.

E. Products:

1. Reference Standard PVC Membrane Roofing:
 - a. Reference Standard: Sarnafil Inc., Sika Sarnafil Rhinobond System with Sarnafil S327 or S327 EnergySmart Membrane.
 - b. Acceptable Manufacturers:
 - 1) Sarnafil, Inc.



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- 2) Soprema Roofing and Waterproofing
- c. Membrane Properties:
 - 1) Comply with requirements of ASTM D4434, Type III
 - 2) Thickness: 60 mils (1.5 mm) minimum
 - 3) Reinforcement: Polyester scrim
 - 4) Color: White; Tan where exposed to view from inside the building.
- d. Membrane and Flashing Seaming: Hot-air welding
2. Alternative KEE Membrane Roofing: Specify in lieu of PVC only with Owner's Approval.
 - a. Reference Standard: Carlisle Syntec Systems, Sure-Flex KEE Membrane.
 - b. Acceptable Manufacturers:
 - 1) Carlisle Syntec Systems: Sure-Flex KEE
 - 2) Seaman Corporation: FiberTite-XT
 - 3) The Garland Company, Inc.: Kee-Stone
 - c. Membrane Properties:
 - 1) Comply with requirements of ASTM D6754
 - 2) Plasticizer: High molecular weight polymer such as Du Pont® Elvaloy® KEE HP resin modifier, an ethylene/vinyl acetate/carbon monoxide (E/VA/CO).
 - a) Molecular Weight: 409,000u
 - 3) Thickness: 60 mils (1.5 mm) minimum
 - 4) Reinforcement: Polyester scrim
 - 5) Color: White; Tan where exposed to view from inside the building.
 - d. Membrane and Flashing Seaming: Hot-air welding
3. Substrate Board:
 - a. Glass-Mat, water-resistant gypsum board complying with ASTM C1177:
 - b. Manufacturers:
 - 1) CertainTeed Corporation: GlasRoc Roof Board
 - 2) Georgia-Pacific Corporation: Dens-Deck Prime
 - 3) USG Corporation: Securerock Glass Mat Roof Board
4. Roof Insulation:
 - a. Extruded polystyrene or polyisocyanurate board insulation acceptable to the Roofing System manufacturer.
 - b. Extruded Polystyrene Board Insulation: ASTM C578, Type IV, 1.6 lb/cf, minimum aged R-value of 5.0.
 - c. Polyisocyanurate Insulation Board: ASTM C1289, Type II, Class 1, Grade 3, felt or glass-fiber mat faced on both sides, minimum aged R-value of 5.0.



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- d. Provide tapered insulation of the same material as the base insulation.
- 5. Cover Board:
 - a. Glass-Mat, water-resistant gypsum board complying with ASTM C1177:
 - b. Manufacturers:
 - 1) CertainTeed Corporation: GlasRoc Roof Board
 - 2) Georgia-Pacific Corporation: Dens-Deck Prime
 - 3) USG Corporation: Securerock Glass Mat Roof Board
 - 4) Roofing Membrane manufacturer's approved and warranted cover board containing no wood or wood fiber.
- 6. Walkways:
 - a. Roofing Membrane manufacturers factory-formed, non-porous, heavy-duty, slip-resisting, surface-textured walkway pads or rolls, suitable for hot-air welding or adhesive bonding to the roofing membrane.
 - b. Provide walkways around each piece of roof mounted equipment and from roof access point(s) to equipment.
- 7. Fall Protection Anchors: Where parapets of sufficient height are not provided, provide fall Protection Anchors a minimum of 10 feet from the roof edge.
 - a. Anchors shall be spaced so the included angle from parapet edge to anchor does not exceed 15 degrees each side of center.
 - b. Confer with the Owner to determine type and spacing of anchors.
- 8. Roofing Attachment:
 - a. Mechanically-fastened, induction-heated welding plates: RhinoBond coated welding plates with corrosion-resistant fasteners.
 - b. Adhesive: Fully-adhered roofing system where mechanically-fastened induction-heated welding plates are not practical.
- 9. Field Quality Control:
 - a. Pre-Installation Fastener Testing:
 - 1) The Applicator shall conduct fastener pullout tests in accordance with the latest version of the SPRI/ANSI Fastener Pullout Standard to verify condition of the deck/substrate and to confirm expected pullout values.
 - 2) All testing results to be submitted to the Architect or design consultant for review before work commences.
 - 3) The Applicator shall submit fastener pull out test results to roofing manufacturer for their use in determining fastening pattern for insulation and/or membrane. Manufacturer shall provide fastener lay out patterns based on pull out test results for review by the Architect.



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- b. Quality Control of Welded Seams:
- 1) The Applicator shall check all welded seams for continuity using a rounded screwdriver, or probe recommended by the manufacturer.
 - 2) On-site evaluation of welded seams shall be made daily by the Applicator at locations as directed by the Architect or Design Consultant or manufacturer's representative.
 - 3) Samples of welded one-inch wide cross-section seams shall be taken at least two times a day and tested for shearing failure of the membrane. Each test cut shall be patched by the Applicator at no extra cost to the Owner.

END OF SECTION