

18-225

SECTION 07 00 00

2018 Summit County Juvenile Court Roof Replacement

PART 1 GENERAL

The 2018 Summit County Juvenile Court Roof Replacement project consists of replacing the roof area on south side of the building containing large HVAC equipment and roof equipment screens on the Juvenile Court building in Akron, Ohio.

The basis of design: Installing Firestone RubberGard EPDM Adhered Roofing System as outlined below:

Apply the Fully Adhered EPDM Roofing System in conjunction with tapered polyiso rigid insulation over the existing deck after removing all existing built-up roofing.

1.01 SUMMARY

- A. Furnish and install elastomeric sheet roofing system, including:
 - 1. Roofing manufacturer's requirements for the specified warranty.
 - 2. Preparation of roofing substrates.
 - 3. Wood nailers for roofing attachment.
 - 4. Insulation.
 - 5. Elastomeric EPDM membrane roofing.
 - 6. Roof related architectural metals.
 - 7. Flashings.
 - 8. Walkway pads.
 - 9. Other roofing-related items specified or indicated on the drawings or otherwise necessary to provide a complete weatherproof roofing system.
- B. Disposal of demolition debris and construction waste is the responsibility of Contractor. Perform disposal in manner complying with all applicable federal, state, and local regulations.
- C. Provide all labor, material, tools, equipment, and supervision necessary to complete the installation of a Firestone RubberGard™ 60-mil thick reinforced EPDM membrane Fully Adhered Roofing System. Work includes new flashings, flat stock and tapered insulation as specified herein. Roof system shall be installed in strict accordance with the manufacturer's most current 20-year system specifications and details.
- D. Comply with the published recommendations and instructions of the roofing membrane manufacturer, at <http://manual.fsbp.com>.
- E. Commencement of work by the Contractor shall constitute acknowledgement by the Contractor that this specification can be satisfactorily executed, under the project conditions and with all necessary prerequisites for warranty acceptance by roofing membrane manufacturer.

1.02 EXTENT OF WORK

- A. Scope of Work – Roof replacement includes but not limited to:
 - 1. The roofing contractor is responsible for having full knowledgeable of all project requirements, specifications, contract documents, design criteria, roofing manufacturer's details and specification for system and warranty specified. Contractor is responsible for having full knowledgeable of all job site measurements, dimensions, existing roof thicknesses, conditions and restrictions that will affect their work schedule and performance for proper project closeout.

2. Protect and repair green and hardscape areas. Repair or replace all staging and lay-down areas as per existing. It is recommended that the roofing contractor photograph, note or great video of all existing property and grounds to be effected with this roofing project.
3. Properly remove the existing roof membrane, flashings, metal flashings, insulation in their entirety down to the concrete roof deck or wall substrates. The existing roof reportedly consists of a hot mop covering on the concrete deck, an 1/8-inch per foot tapered polyiso insulation, 1/2" cover board and 4 ply coal tar with flood coat and gravel.
4. Contractor is responsible for all the removal, hauling and approved dump site records for all project demolition, debris and other project site cleanup. All flashings on this project will be assumed to contain non-friable asbestos. Contractor will remove flashings manually and follow all regulations for disposal.
5. Patch and repair of the concrete roof deck as needed prior to installation of the new roof. Roof deck will be replaced at the Unit Price #1 cost per square foot of area.
6. Prepare roof top equipment curb walls to receive new EPDM wall flashings, new metal counterflashings as needed. Where possible extend membrane up and over curb wall. Raise curbs were required to have an 8-inch minimum flashing height above finished roof.
7. Remove and replace with new, all roof drain clamping rings and bolts.
8. At existing roof-to-wall expansion, install new membrane manufacturer's flashing details and counter-flashings as needed.
9. At mechanical room entry, cut and raise bottom of man door. Fabricate and install new heavy gauge metal curb and threshold to obtain a 4-inch flashing height above the finished roof. Flash and seal to meet manufacturers requirements to be included in roof system warranty.
10. Remove existing fascia and gravel stop. Install new wood blocking to match height of new tapered insulation at its highest point as required. Reinstall existing metal fascia and install new edge metal as required to meet new roof elevation. All new edge metal and metal related work shall be pre-manufactured and supplied and warranted by the roof system manufacturer. Edge metal to match existing.
11. Install new roof insulation with low rise foam adhesive. Unless otherwise indicated, install a tapered rigid insulation system with 1/8" per foot slope and minimum thickness of 1 1/2 -inch start at drains. The final roof insulation thickness shall meet an average R-value of 25. An alternate roof price will be included with the bid to install a 1/4" per foot slope insulation system.
12. Install RPF Strips or mechanically fastened reinforced EPDM securement strips at perimeters.
13. Install new pourable sealer pockets, prefabricated pipe boots and field fabricated pipe seals at all existing penetrations as needed.
14. Remove obsolete curbs, pipes, vents and miscellaneous supports as indicated by the owner's representative. Install metal plating and bracing at roof openings in concrete deck.
15. Remove existing stairs as required to install new roof system. Reinstall existing metal stairs at end of roofing project. Also include in the bid the cost to replace two wooded stair sections with new metal stairs. New stairs will match dimensions of existing stairs and have a galvanized finish.
16. Install walkway pads at roof access stairs and around roof top mechanical units or areas having service access panels. Install walk pads per project specifications.

1.03 REFERENCES

- A. Referenced Standards: These standards form part of this specification only to the extent they are referenced as specification requirements:

1. ASTM C 1177/C 1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2006.
2. ASTM C 1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2013.
3. ASTM D 3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2012.
4. ASTM D 4637 - Standard Specification for EPDM Sheet used in Single-Ply Roof Membrane; 2004.
5. ASTM D 4811 - Standard Specification for Nonvulcanized (Uncured) Rubber Sheet Used as Roof Flashing; 2004.
6. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2013a.
7. ASTM E 136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace At 750 Degrees C; 2012.
8. Ohio Building Code (Effective 2017)
9. International Energy Conservation Code (IECC) 2012
10. ANSI/ASHRAE/IESNA Standard 90.1 - 2010: Energy Standard for Buildings Except Low-Rise Residential Buildings
11. Underwriters Laboratories (UL): TGFU R1306 - "Roofing Systems and Materials Guide". UL-790 - Standard Test Method for Fire Tests of Roof Coverings.
12. PS 1 - Construction and Industrial Plywood; 2009.
13. PS 20 - American Softwood Lumber Standard; 2010.
14. FM 1-28 - Design Wind Loads; Factory Mutual System; 2007.
15. FM 1-29 - Roof Deck Securement and Above Deck Roof Components; Factory Mutual System; 2006.
16. FM 4470 - Approval Standard - Class I Roof Covers; current version.
17. ANSI/SPRI WD-1 "Wind Design Standard for Roofing Assemblies".
18. SPRI ES-1 – 11, Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems; 2007. (ANSI/SPRI ES-1).
19. National Roofing Contractors Association (NRCA) - Low Slope Roofing and Waterproofing Manual, Current Edition.
20. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) - Architectural Sheet Metal Manual.

1.04 SUBMITTALS

- A. Product Data:
 1. Provide membrane manufacturer's printed data sufficient to show that all components of roofing system, including insulation and fasteners, comply with the specified requirements and with the membrane manufacturer's requirements and recommendations for the system type specified; include data for each product used in conjunction with roofing membrane.
 2. Installation Instructions: Provide manufacturer's instructions to installer, marked up to show exactly how all components will be installed; where instructions allow installation options, clearly indicate which option will be used.
- B. Shop Drawings: Provide:
 1. The roof membrane manufacturer's standard details customized for this project for all relevant conditions, including flashings, base tie-ins, roof edges, terminations, expansion joints, penetrations, and drains.
- C. Pre-Installation Notice: Copy to show that manufacturer's required Pre-Installation Notice (PIN)

has been accepted and approved by the manufacturer.

- D. Executed Warranty as a requirement of project close-out.
- E. Specimen Warranty: Submit prior to starting work.
- F. Samples: Submit samples of each product to be used.

1.05 QUALITY ASSURANCE

- A. Applicator Qualifications: Roofing installer shall have the following:
 - 1. At least five years of experience in installing specified system.
 - 2. Capability to provide payment and performance bond to building owner.
- B. Pre-Installation Conference: Before start of roofing work, Contractor shall hold a meeting to discuss the proper installation of materials and requirements to achieve the warranty.
 - 1. Require attendance with all parties directly influencing the quality of roofing work or affected by the performance of roofing work.
 - 2. Notify owner's representative well in advance of meeting.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Deliver products in manufacturer's original containers, dry and undamaged, with seals and labels intact and legible.
- B. Store materials clear of ground and moisture with weather protective covering.
- C. Insulation and roofing membrane must be stored in a well-drained area on pallets, a minimum of 4-inches off the floor, roof or ground, and tightly covered with waterproof breathable tarps.
- D. When loading materials onto the roof, the roofing contractor must comply with the requirements of the building owner to prevent overloading and possible disturbance to the building structure.
- E. Keep combustible materials away from ignition sources.

1.07 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
- B. Material Safety Data Sheets (MSDS) must be on location at all times during the transportation, storage and application of materials.
- C. 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.
- 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. 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.
- F. 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.
- G. New roofing shall be complete and weather tight at the end of each work day.
- H. Contaminants such as grease, fats and oils shall not be allowed to come in direct contact with the roofing membrane.

1.07 WARRANTY

- A. Comply with all warranty procedures required by manufacturer, including notifications, scheduling, and inspections.
- B. Warranty: Firestone 20-year Red Shield Limited Warranty covering membrane, roof insulation, and membrane accessories.
 - 1. Limit of Liability: No dollar limitation.
 - 2. Scope of Coverage: Repair leaks in the roofing system caused by:
 - a. Ordinary wear and tear of the elements.
 - b. Manufacturing defect in Firestone brand materials.
 - c. Defective workmanship used to install these materials.
 - d. Damage due to winds up to 72 mph.
 - e. Limited repair of leaks caused by unintentional and occasional damage result of normal rooftop inspection, maintenance or service.
 - 3. Not Covered:
 - a. Damage due to winds in excess of 72 mph.
 - b. Damage due to hurricanes or tornadoes.
 - c. Intentional damage.
 - d. Unintentional damage due to normal rooftop inspections, maintenance, or service.
- C. Special Project Warranty: Submit roofing Installer's warranty, signed by Installer, covering Work of this Section, including all components of membrane roofing system such as roofing membrane, base flashing, roof insulation, fasteners, roof walkway products, painting, wood blocking, curb mountings, metal flashings, and edge metal for the following warranty period: 2-years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Acceptable Manufacturer - Roofing System: Firestone Building Products Co., Carmel, IN. www.firestonebpc.com.
 - 1. Roofing systems manufactured by others may be acceptable provided the roofing system is completely equivalent in materials and warranty conditions and the manufacturer meets the following qualifications:
 - a. Specializing in manufacturing the roofing system to be provided.
 - b. Minimum ten years of experience manufacturing the roofing system to be provided.
 - c. Able to provide a no dollar limit, single source roof system warranty that is backed by corporate assets in excess of one billion dollars.
 - d. ISO 9002 certified.
 - e. Able to provide polyiso insulation that is produced in own facilities.
- B. Other Acceptable Manufacturer: Carlisle SynTec, Johns Manville and Versico.
- C. Manufacturer of Insulation: Same manufacturer as roof membrane.
- D. Manufacturer of Metal Roof Edging: Same manufacturer as roof membrane.
 - 1. Metal roof edging products by other manufacturers are not acceptable.
 - 2. Field or shop-fabricated metal roof edgings and copings not ES-1-11 certified are not acceptable.
- E. Substitution Procedures: See Instructions to Bidders.
 - 1. Submit evidence that the proposed substitution complies with the specified requirements.

2.02 ROOFING SYSTEM DESCRIPTION

- A. Roofing System:
 - 1. Membrane: Ethylene propylene diene monomer (EPDM).

2. Thickness: As specified elsewhere.
 3. Membrane Attachment: Fully adhered.
 4. Slope: Deck is sloped but not enough; provide additional slope of 1/4 inch per foot (1:48) by means of tapered insulation.
 5. Comply with applicable local building code requirements.
 6. Provide assembly having Underwriters Laboratories, Inc. (UL) Class A Fire Hazard Classification.
 7. Provide assembly complying with Factory Mutual Corporation (FM) Roof Assembly Classification, FM DS 1-28 and 1-29, and meeting minimum requirements of FM 1- 60 wind uplift rating.
- B. Air and Vapor Barrier: (Base Bid)
1. Membrane: High density polyethylene sheet with SBS modified bitumen adhesive.
 2. Attachment: Self adhering.
- C. Insulation:
1. Total System R Value: 25 or greater.
 2. Maximum Board Thickness: 2 inches; use as many layers as necessary; stagger joints in adjacent layers.
 3. Base Layer: Polyisocyanurate foam board, non-composite.
 - a. Attachment: Low-rise polyurethane adhesive
 4. Tapered Layers: Polyisocyanurate foam board, non-composite.
 - a. Attachment: Low-rise polyurethane adhesive.

2.03 EPDM MEMBRANE MATERIALS

- A. Roofing and Flashing Membrane: *Black* cured synthetic single-ply membrane composed of ethylene propylene diene terpolymer (EPDM) with the following properties:
1. Thickness: 0.060 inch.
 2. Reinforcement: Polyester weft inserted scrim; membrane complying with ASTM D 4637 Type II.
 3. Nominal Thickness Tolerance: Plus/minus 10 percent.
 4. Sheet Width: Provide the widest available sheets to minimize field seaming.
- B. Acceptable Product: RubberGard Reinforced EPDM Membrane by Firestone. Membrane Fasteners: Type and size as required by roof membrane manufacturer for roofing system and warranty to be provided; use only fasteners furnished by roof membrane manufacturer.
- C. Flashing Membrane: Self-curing, non-reinforced membrane composed of nonvulcanized EPDM rubber, complying with ASTM D 4811 Type II, and with the following properties:
1. Thickness: 0.055 inch.
 2. Color: Same as field membrane
 3. Acceptable Product: RubberGard EPDM or FormFlash by Firestone.
- D. Self-Adhesive Flashing Membrane: Semi-cured 45 mil EPDM membrane laminated to 35 mil EPDM tape adhesive; QuickSeam Flashing by Firestone.
- E. Pre-Molded Pipe Flashings: EPDM, molded for quick adaptation to different sized pipes; Firestone EPDM Pipe Flashing.
- F. Self-Adhesive Lap Splice Tape: 35 mil EPDM-based, formulated for compatibility with EPDM membrane and high-solids primer; QuickSeam Splice Tape by Firestone.
- G. Splice Adhesive: Synthetic polymer-based, formulated for compatibility with EPDM membrane and metal surfaces; SA-1065 Splice Adhesive by Firestone.
- H. Bonding Adhesive: Neoprene-based, formulated for compatibility with EPDM membrane and wide variety of substrate materials, including masonry, wood, and insulation facings; Bonding Adhesive BA-2004 by Firestone.
- I. Adhesive Primer: Synthetic rubber based primer formulated for compatibility with EPDM membrane and tape adhesive, with VOC content less than 2.1 lb/gal (250 g/L) by Firestone.

- J. Low Rise Foam Adhesive: Two-component, low-rise polyurethane adhesive designed to attach polyisocyanurate insulation to a variety of acceptable substrates; ISO Stick by Firestone.
- K. Seam Edge Treatment: EPDM rubber-based sealant, formulated for sealing exposed edges of membrane at seams; Lap Sealant HS by Firestone.
- L. Pourable Sealer: Two-part polyurethane, two-color for reliable mixing; Pourable Sealer by Firestone.
- M. Water Block Seal: Butyl rubber sealant for use between two surfaces, not exposed; Water Block Seal by Firestone.
- N. Metal Plates and Strips Used for Fastening Membrane and Insulation: Steel with Galvalume coating; corrosion-resistance meeting FM 4470 criteria.
 - 1. Termination Bars: Aluminum bars with integral caulk ledge; 1.3 inches wide by 0.10 inch thick; Firestone Termination Bar by Firestone.
- O. Roof Walkway Pads: EPDM, 0.30 inch thick by 30 by 30 inches with EPDM tape adhesive strips laminated to the bottom; QuickSeam Walkway Pads by Firestone.

2.04 ROOF INSULATION AND COVER BOARDS

- A. Polyisocyanurate Board Insulation: Firestone RESISTA flat and tapered roof insulation consists of a closed-cell polyiso foam core laminated to a specially coated, inorganic, fiberglass facer, meeting or exceeding the requirements of ASTM C 1289, Type II, Class 2. RESISTA insulation is a mold resistant material per ASTM D3273.:
 - 1. Thickness: Tapered system and as indicated elsewhere.
 - 2. Size: 48 inches by 96 inches, nominal.
 - a. Exception: Insulation to be attached using adhesive no larger than 48 inches by 48 inches, nominal.
 - 3. R-Value (LTTR): 1.0 inch Thickness: 5.7, minimum.
 - 4. Compressive Strength: 20 psi (138 kPa) when tested in accordance with ASTM C 1289.
 - 5. Ozone Depletion Potential: Zero; made without CFC or HCFC blowing agents.
 - 6. Recycled Content: 19 percent post-consumer and 15 percent post-industrial, average.
- B. Gypsum-Based Substrate Board: DensDeck® Prime Roof Board is an exceptional fire barrier, thermal barrier and recovery board used in various commercial roofing systems. The product features a pre-primed surface to make the bond even stronger. Non-combustible, water resistant gypsum core with embedded glass mat facers, complying with ASTM C 1177/C 1177M, and with the following additional characteristics:
 - 1. Size: 48 inches by 96 inches, nominal.
 - a. Exception: Board to be attached using adhesive may be no larger than 48 inches by 48 inches, nominal.
 - 2. Thickness: 0.5 inch.
 - 3. Surface Water Absorption: 2.5 g, maximum, when tested in accordance with ASTM C 473.
 - 4. Spanning Capability: Recommended by manufacturer for following minimum flute spans:
 - 5. Surface Burning Characteristics: Flame spread of 0, smoke developed of 0, when tested in accordance with ASTM E 84.
 - 6. Combustibility: Non-combustible, when tested in accordance with ASTM E 136.
 - 7. Factory Mutual approved for use with FM 1-60 and 1-90 rated roofing assemblies.
 - 8. Mold Growth Resistance: Zero growth, when tested in accordance with ASTM D 3273 for minimum of 4 weeks.
- C. Insulation Fasteners: Type and size as required by roof membrane manufacturer for roofing system and warranty to be provided; use only fasteners furnished by roof membrane manufacturer.
- D. Adhesive for Insulation Attachment: Type as required by roof membrane manufacturer for roofing system and warranty to be provided; use only adhesives furnished by roof membrane manufacturer.

2.05 AIR & VAPOR BARRIER

- A. Vapor Barrier Membrane: Comprised of SBS modified bitumen adhesive, factory-laminated to a tri-laminate woven, high-density polyethylene top surface. Release liner protecting adhesive.
1. Intended for use as a direct to deck air/vapor barrier in roofing systems and may be used as a temporary roof membrane for up to ninety (90) days.
 2. Thickness: 0.0325" minimum, when tested in accordance with ASTM D 5147.
 3. Max Load at Break at 73 °F (23 °C): 64 lbf/in, MD (11 kN/m) 88 lbf/in, XMD (15 kN/m) when tested in accordance with ASTM D 5147.
 4. Low Temperature Flexibility: -30 °F (-34 °C) when tested in accordance with ASTM D 5147.
 5. Moisture Vapor Permeance, 0.02 Perms (0.92 Ng/Pa*s*m2) maximum, when tested in accordance with ASTM E 96.
 6. Air Permeability: 0.00114 ft3/min*ft2 (0.007 L/sec*m2) maximum, when tested in accordance with ASTM E 2178.
- B. Acceptable Product: V-Force Vapor Barrier Membrane by Firestone.

2.06 METAL ACCESSORIES

- A. Metal Roof Edging and Fascia: EdgeGard & Fascia by Firestone - Continuous metal edge member serving as termination of roof membrane and retainer for metal fascia; watertight with no exposed fasteners; mounted to roof edge nailer.
1. Wind Performance:
 - a. Membrane Pull-Off Resistance: 150 lbs/ft, minimum, when tested in accordance with ANSI/SPRI ES-1 Test Method RE-1, current edition.
 - b. Fascia Pull-Off Resistance: At least the minimum required when tested in accordance with ANSI/SPRI ES-1 Test Method RE-2, current edition.
 - c. 20 Year, 110 mph wind warranty rated.
 - d. Factory Mutual 1-195 approved for wind up lift protection.
 2. Description: Two-piece; 45 degree sloped galvanized steel sheet edge member securing top and bottom edges of formed metal fascia; Firestone EdgeGard.
 3. Fascia Face Height: 5 inches.
 4. Edge Member Height Above Nailers: 1-1/4 inches minimum.
 5. Fascia Material and Finish: 24 gage, 0.024 inch galvanized steel with Kynar 500 finish in manufacturer's standard color; matching concealed joint splice plates; color selected and approved by building owner's representative.
 6. Length: 144 inches.
 7. Functional Characteristics: Fascia retainer supports while allowing for free thermal cycling of fascia.
 8. Waterdam: Continuous 24 gauge commercial type G-90 galvanized steel at 12 feet 0 inches (3.65 m) standard lengths.
 9. Spring Clips: 24 gage, 0.036 inch G90 coated commercial type galvanized steel.
 10. Fasteners: Factory-provided corrosion resistant fasteners, with drivers; no exposed fasteners permitted.
- B. Parapet Copings: Coping (Tapered) by Firestone - A fully engineered coping system designed with 24-gauge galvanized steel continuous cleats on the inside and outside faces, butt type joints with concealed splice plates; mechanically fastened. Finished coping cap shall have a 2% slope minimum draining to the roof side of the wall.
1. Wind Performance:
 - a. At least the minimum required when tested in accordance with ANSI/SPRI ES-1 Test Method RE-3, current edition.
 - b. Provide product listed in current Factory Mutual Research Corporation Approval Guide with at least FM 1-90 rating.
 2. Coping cap: length of 12 feet 0 inches, widths to 24 inch, manufactured to job requirements. Material and Finish: 24 gage, 0.024 inch thick galvanized steel with Kynar 500 finish in manufacturer's standard color; color selected and approved by building owner's

- representative.
3. Dimensions:
 - a. Wall Width: As indicated on the drawings.
 - b. Piece Length: Minimum 144 inches.
 - c. Curved Application: Factory fabricated in true radius.
 4. 8" wide concealed splice plates with dual non-curling isocryl butyl sealant strips allow for thermal movement of materials and seals all joints.
 5. Anchor/Support Cleats: 20 gage, 0.036 inch thick pre-punched galvanized cleat with 12 inch wide stainless steel spring mechanically locked to cleat at 48 inches on center.
 6. Special Shaped Components: Provide factory-fabricated pieces necessary for complete installation, including miters, corners, intersections, curves, pier caps, and end caps; minimum 14 inch long legs on corner, intersection, and end pieces.
 7. Fasteners: Factory-furnished; electrolytically compatible; minimum pull out resistance of 240 pounds (109 kg) for actual substrate used; no exposed fasteners.
- C. Above edge metal and copings as specified to be supplied and warranted roofing manufacturer meeting ANSI/SPRI ES-1.

2.07 ACCESSORY MATERIALS

- A. Drain Inserts:
1. Insert Drains consist of an 18" square aluminum flange with a 9" long drain stem in a depressed sump area for easy attachment to the deck and drainage system. Insert Drains include a 14" diameter strainer dome, stainless steel studs and nuts, and a high quality urethane seal to prevent possible water backflow. Properly size for maximum water flow.
- B. Pipe Supports:
2. Pipe Supports: T triangle extruded EPDM rubber shaped to shed water and the wide platform base provides stability and balance. Pipe Supports are available in three sizes to accommodate piping up to 5".
- C. Lumber:
1. Install new wood blocking as needed to complete this project meeting NRCA and SMACNA recommendations, specifications and details.
 2. New wood blocking to be installed and attached per local building codes and ANSI/SPRI/FM 4435/ES-1. Refer to Carlisle's DR-08-11 "Wood Nailers and Securement Criteria" (Factory Mutual Loss Prevention Data Sheet 1-19).
 3. Wood Nailers: Structural Grade No. 2 or better Southern Pine, Douglas Fir that are anchored to steel, wood or masonry decking should not be less than 2" X 6" nominal (minimum 1-1/2" X 5-1/2").
- D. Metal Deck Plating:
1. Replacement metal deck panels shall be galvanized steel with a minimum 20 gauge, Grade E and G90 zinc coated.
 2. Install metal deck plating over concrete deck openings fastened a minimum of 6 inches from concrete edge to be covered using Tap-con type fasteners. Fasten shall yield a minimum of 200 psf per fastener. Fastened plating shall have one fastener in each corner with a maximum spacing of 12" o.c. fastening between the corner fasteners

PART 3 INSTALLATION

3.01 GENERAL

- A. Install roofing, insulation, flashings, and accessories in accordance with roofing manufacturer's published instructions and recommendations for the specified roofing system. Where manufacturer provides no instructions or recommendations, follow good roofing practices and industry standards. Comply with federal, state, and local regulations.
- B. Obtain all relevant instructions and maintain copies at project site for duration of installation period.
- C. Do not start work until Pre-Installation Notice has been submitted to manufacturer as notification that this project requires a manufacturer's warranty.
- D. Perform work using competent and properly equipped personnel.
- E. Temporary closures, which ensure that moisture does not damage any completed section of the new roofing system, are the responsibility of the applicator. Completion of flashings, terminations, and temporary closures shall be completed as required to provide a watertight condition.
- F. Install roofing membrane only when surfaces are clean, dry, smooth and free of snow or ice; do not apply roofing membrane during inclement weather or when ambient conditions will not allow proper application; consult manufacturer for recommended procedures during cold weather. Do not work with sealants and adhesives when material temperature is outside the range of 60 to 80 degrees F (15 to 25 degrees C).
- G. Protect adjacent construction, property, vehicles, and persons from damage related to roofing work; repair or restore damage caused by roofing work.
 - 1. Protect from spills and overspray from bitumen, adhesives, sealants and coatings.
- H. Particularly protect metal, glass, plastic, and painted surfaces from bitumen, adhesives, and sealants within the range of wind-borne overspray.
- I. Protect finished areas of the roofing system from roofing related work traffic and traffic by other trades.
- J. Until ready for use, keep materials in their original containers as labeled by the manufacturer.
- K. Consult membrane manufacturer's instructions, container labels, and Material Safety Data Sheets (MSDS) for specific safety instructions. Keep all adhesives, sealants, primers and cleaning materials away from all sources of ignition.

3.02 EXAMINATION

- A. Examine roof deck to determine that it is sufficiently rigid to support installers and their mechanical equipment and that deflection will not strain or rupture roof components or deform deck.
- B. Verify that surfaces and site conditions are ready to receive work. Correct defects in the substrate before commencing with roofing work.
- C. Examine roof substrate to verify that it is properly sloped to drains.
- D. Verify that the specifications and drawing details are workable and not in conflict with the roofing manufacturer's recommendations and instructions; start of work constitutes acceptable of project conditions and requirements.

3.03 PREPARATION

- A. Take appropriate measures to ensure that fumes from adhesive solvents are not drawn into the building through air intakes.
- B. Prior to proceeding, prepare roof surface so that it is clean, dry, and smooth, and free of sharp edges, fins, roughened surfaces, loose or foreign materials, oil, grease and other materials that may damage the membrane.

- C. Fill all surface voids in the immediate substrate that are greater than 1/4 inch wide with fill material acceptable insulation to membrane manufacturer.
- D. Seal, grout, or tape deck joints, where needed, to prevent bitumen seepage into building.

3.04 AIR & VAPOR BARRIER INSTALLATION

- A. Seal all cracks and voids around roof penetrations and other openings in the concrete deck. Surfaces must be primed prior to application air and vapor barrier. Use only primer supplied by membrane manufacturer.
- B. Application can be made at ambient temperatures as low as 25 °F (-4 °C) as long as membrane has been stored in a heated area so that it will be between 50 °F (10 °C) and 100 °F (38 °C) at the time of application.
- C. Install with minimum 3" laps on field fabricated pipe seals and 6" end laps on larger deck cracks or opening over-lays.
- D. Where possible, roll in with a 75 lb (34 kg) roller to fully mate each roll to flat substrates, including all lap areas.

3.05 INSULATION ATTACHMENT

- A. Securely attach insulation to the roof deck for Adhered Roofing Systems. Attachment must have been successfully tested to meet or exceed the calculated uplift pressure required by the International Building Code (ASCE-7) or ANSI/SPRI WD-1.
- B. Enhance the perimeter and corner areas in accordance with the International Building Code (ASCE-7) or ANSI/SPRI WD-1.
- C. Install only as much insulation as can be covered with the completed roofing system before the end of the day's work or before the onset of inclement weather.
- D. Lay roof insulation in courses parallel to roof edges.
- E. Neatly and tightly fit insulation to all penetrations, projections, and nailers, with gaps not greater than 1/4 inch. Fill gaps greater than 1/4 inch with acceptable insulation. Do not leave the roofing membrane unsupported over a space greater than 1/4 inch.
- F. Metal Deck: Where applicable, secure base layer of insulation to the substrate with the required mechanical fasteners at a minimum of one fastener per two square feet in the field of roof. Enhance perimeters and corners as required per ANSI/SPRI WD-1. Install insulation fasteners in accordance with the manufacturer's current application guidelines and approvals.
 - 1. Project specific: Fasteners and plates per 4' by 4' board, field of roof - 8, perimeter of roof - 12 and corners of roof - 16.
- G. Concrete Deck Adhesive Attachment: Install insulation layers, maximum 4 feet by 4 feet, applied with adhesive, coverage rate as necessary to achieve the specified attachment and uplift rating. Apply adhesive bead so that the distance from the edge of the board does not exceed half the bead spacing (i.e. within 3" of bead spacing of 6" O.C.) Press each board firmly into place after adhesive develops strings when touched, typically 1-1/2 to 2 minutes after adhesive was applied and roll with a weighted roller. Add temporary weight and use relief cuts to ensure boards are well adhered. Stagger the joints of additional layers by a minimum of 6 inches.
 - 1. Project specific: Adhesive ribbon spacing per 4' by 4' board, field of roof - 6" o.c., perimeter of roof - 6" o.c. and corners of roof - 4" o.c.

3.06 SINGLE-PLY MEMBRANE INSTALLATION

- A. Beginning at low point of roof, place membrane without stretching over substrate and allow to relax at least 30 minutes before attachment or splicing; in colder weather allow for longer relax time.
- B. Lay out the membrane pieces so that field and flashing splices are installed to shed water.

- C. Install membrane without wrinkles and without gaps or fishmouths in seams; bond and test seams and laps in accordance with membrane manufacturer's instructions and details.
- D. Install membrane adhered to the substrate, with edge securement as specified.
- E. Adhered Membrane: Bond membrane sheet to substrate using membrane manufacturer's recommended bonding material, application rate, and procedures.
- F. Edge Securement: Secure membrane at all locations where membrane terminates or goes through an angle change greater than 2 in 12 inches (1:6) using mechanically fastened reinforced perimeter fastening strips, plates, or metal edging as indicated or as recommended by roofing manufacturer.
 - 1. Exceptions: Round pipe penetrations less than 18 inches in diameter and square penetrations less than 4 inches square.
 - 2. Metal edging is not merely decorative; ensure anchorage of membrane as intended by roofing manufacturer.

3.07 FLASHING AND ACCESSORIES INSTALLATION

- A. Install flashings, including laps, splices, joints, bonding, adhesion, and attachment, as required by membrane manufacturer's recommendations and details.
- B. Metal Accessories: Install metal edgings, gravel stops, and copings in locations indicated on the drawings, with horizontal leg of edge member over membrane and flashing over metal onto membrane.
 - 1. Follow roofing manufacturer's instructions.
 - 2. Remove protective plastic surface film immediately before installation.
 - 3. Install water block sealant under the membrane anchorage leg.
 - 4. Flash with manufacturer's recommended flashing sheet unless otherwise indicated.
 - 5. Where single application of flashing will not completely cover the metal flange, install additional piece of flashing to cover the metal edge.
 - 6. If the roof edge includes a gravel stop and sealant is not applied between the laps in the metal edging, install an additional piece of self-adhesive flashing membrane over the metal lap to the top of the gravel stop; apply seam edge treatment at the intersections of the two flashing sections.
 - 7. When the roof slope is greater than 1:12, apply seam edge treatment along the back edge of the flashing.
- C. Scuppers: Set in sealant and secure to structure; flash as recommended by manufacturer.
- D. Roofing Expansion Joints: Install as shown on drawings and as recommended by roofing manufacturer.
- E. Flashing at Walls, Curbs, and Other Vertical and Sloped Surfaces: Install weathertight flashing at all walls, curbs, parapets, curbs, skylights, and other vertical and sloped surfaces that the roofing membrane abuts to; extend flashing at least 8 inches high above membrane surface.
 - 1. Use the longest practical flashing pieces.
 - 2. Evaluate the substrate and overlay and adjust installation procedure in accordance with membrane manufacturer's recommendations.
 - 3. Complete the splice between flashing and the main roof sheet with specified splice adhesive before adhering flashing to the vertical surface.
 - 4. Provide termination directly to the vertical substrate as shown on roof drawings.
- F. Roof Drains:
 - 1. Taper insulation around drain to provide smooth transition from roof surface to drain. Use specified pre-manufactured tapered insulation with facer or suitable bonding surface to achieve slope; slope not to exceed manufacturer's recommendations.
 - 2. Position membrane, then cut a hole for roof drain to allow 1/2 to 3/4 inch of membrane to extend inside clamping ring past drain bolts.
 - 3. Make round holes in membrane to align with clamping bolts; do not cut membrane back to bolt holes.

4. Apply sealant on top of drain bowl where clamping ring seats below the membrane
 5. Install roof drain clamping ring and clamping bolts; tighten clamping bolts to achieve constant compression.
- G. Flashing at Penetrations: Flash all penetrations passing through the membrane; make flashing seals directly to the penetration.
1. Pipes, Round Supports, and Similar Items: Flash with specified pre-molded pipe flashings wherever practical; otherwise use specified self-curing elastomeric flashing.
 2. Pipe Clusters and Unusual Shaped Penetrations: Provide penetration pocket at least 2 inches deep, with at least 1 inch clearance from penetration, sloped to shed water.
 3. Structural Steel Tubing: If corner radii are greater than 1/4 inch and longest side of tube does not exceed 12 inches, flash as for pipes; otherwise, provide a standard curb with flashing.
 4. Flexible and Moving Penetrations: Provide weathertight gooseneck set in sealant and secured to deck, flashed as recommended by manufacturer.

3.08 FINISHING AND WALKWAY INSTALLATION

- A. Install walkways at access points to the roof, around rooftop equipment that may require maintenance, and where indicated on the drawings.
1. Use specified walkway pads unless otherwise indicated.
- B. Walkway Pads: Adhere to the roofing membrane, spacing each pad at minimum of 1.0 inch and maximum of 3.0 inches from each other to allow for drainage.
1. If installation of walkway pads over field fabricated splices or within 6 inches (150 mm) of a splice edge cannot be avoided, adhere another layer of flashing over the splice and extending beyond the walkway pad a minimum of 6 inches on either side.
 2. Prime the membrane, remove the release paper on the pad, press in place, and walk on pad to ensure proper adhesion.

3.09 FIELD QUALITY CONTROL

- A. Inspection by Manufacturer: Provide final inspection of the roofing system by a Technical Representative employed by roofing system manufacturer specifically to inspect installation for warranty purposes (i.e. not a sales person).
- B. Perform all corrections necessary for issuance of warranty.

3.10 CLEANING

- A. Clean all contaminants generated by roofing work from building and surrounding areas, including bitumen, adhesives, sealants, and coatings.
- B. Repair or replace building components and finished surfaces damaged or defaced due to the work of this section; comply with recommendations of manufacturers of components and surfaces.
- C. Remove leftover materials, trash, debris, equipment from project site and surrounding areas.

3.11 PROTECTION

- A. Where construction traffic must continue over finished roof membrane, provide durable protection and replace or repair damaged roofing to original condition.

END OF SECTION

