ADDENDUM #2

Project No.:	515-14-104	Date:	3/8/2018
Project:	ADA Compliant Access Various Buildings	A/E Firm:	MEGA/C2AE
			Al
Owner:	Battle Creek VA Medical Center 5500 Armstrong Road Battle Creek, MI 49037		

The following changes, revisions, modifications, etc. shall be incorporated into the contract documents, specifications, and plans.

SPECIFICATIONS

- A2.1 Refer to Section 00 01 10 Table of Contents (reissued):
 ADD Section 07 54 16 Ethylene Interpolymer (KEE) Roofing to the table of contents
 REMOVE Section 07 54 23 Thermoplastic Polyolefin (TPO) Roofing from the table of contents
 ADD Section 07 56 00 Fluid Applied Roofing to the table of contents
- A2.2 Refer to Section 07 54 16 Ethylene Interpolymer (KEE) Roofing (not reissued): ADD section back into the specifications in its entirety
 - Basis of design Tremco TPA
- A2.3 Refer to Section 07 54 23 Thermoplastic Polyolefin (TPO) Roofing (not issued): **REMOVE** section in its entirety
- A2.4 Refer to Section 07 56 00 Fluid Applied Roofing (Issued): ADD section in its entirety
 - Basis of design Tremco AlphaGuard MT

DRAWINGS

- A2.5 Refer to sheet 5-A100 Building 5 First Floor Plan (reissued): ADD detail #5 Fluid Applied Tie-in Detail as shown.
 - This detail shows how the fluid applied roofing system will be used to tie the new roofing system into the existing Tremco PIB roofing system. The existing Tremco PIB roofing system, new fluid applied roofing system and new KEE membrane roofing system all need to be compatible with each other per the specifications.



EDIT Building 5 – Roof Plan as shown.

• This plan shows the extent of the Fluid Applied Roofing system to be used to tie the two roofing systems together.

EDIT the Roof Legend as shown.
EDIT/ADD notes on floor plan regarding pipe railings as shown.
ADD building section cuts to the floor plan as shown.
ADD exterior elevation markers to floor plan as shown.
ADD dimensions to floor plan as shown for clarity.
ADD detail callout of pier to floor plan as shown for detail reference.
ADD partition type for new interior wall construction.
REVISE sheet layout to make room for additional partition type as shown.
EDIT Demolition Plan notes to include concrete curb as shown for clarity.

A2.6 Refer to Sheet 5-A200 (reissued)

ADD building section cuts to the exterior elevations as shown.EDIT note to remove EIFS alternative as shown.ADD detail cut references as shown on exterior elevation #2.

A2.7 Refer to Sheet 5-A300 reissued)

REMOVE notes as shown for clarity on section 3 as detail 4 on 5-A300 notes all the materials. **ADD** detail callout on section 3 as shown to reference detail 4 on 5-A300. **REMOVE/EDIT** dimensions as shown on section 3 in walkway for clarity **REMOVE** notes as shown for clarity on section 2 as detail 1 on 5-A500 notes all the materials. **ADD** detail callout as shown on section 2 to reference detail 4 on 5-A300.

A2.8 Refer to Sheet 5-A500 (reissued)

REMOVE EIFS ALTERNATE DETAILS, Details 3, 4, 7 & 8, from sheet as shown.

• Brick veneer is to be the only material acceptable for the exterior walls of the addition.

EDIT details 5 & 10 as shown for clarity and coordination with floor plan.

General Note:

The noting of basis of design for the Fluid Applied Roofing system and the KEE roofing system is not limiting the product selection down to only what is listed. These are listed as an example of the system that meets the performance specifications, which includes compatibility with all other roofing materials. The specifications are written as performance specs, and therefore any product that meets the performance specifications (including compatibility) will be considered an approved product.

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END OF SECTION

SECTION 07 54 16 - ETHYLENE INTERPOLYMER (KEE) ROOFING

PART 1 - GENERAL

1.1 **DESCRIPTION**

A. This section specifies Ethylene Interpolymer (ketone ethylene ester (KEE)) sheet roofing adhered to roof deck.

1.2 RELATED WORK

- A. Protection of Interior Spaces: Section 01 00 00, GENERAL REQUIREMENTS.
- B. Environmental Controls: Section 01 57 19, TEMPORARY ENVIRONMENTAL CONTROLS.
- C. Sustainable Design Requirements: Section 01 81 13, SUSTAINABLE CONSTRUCTION REQUIREMENTS.
- D. Treated wood framing, blocking, and nailers: Section 06 10 00, ROUGH CARPENTRY
- E. Roof Insulation: Section 07 22 00, ROOF AND DECK INSULATION.
- F. Sheet Metal Components and Wind Uplift Requirements for Roof-Edge Design: Section 07 60 00, FLASHING AND SHEET METAL.
- G. Miscellaneous Items: Section 07 71 00, ROOF SPECIALTIES.

1.3 PERFORMANCE REQUIREMENTS

A. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by membrane roofing manufacturer, based on testing and field experience.

- B. Roofing System Energy Performance Requirements: Provide a roofing system identical to components that have been successfully tested by a qualified independent testing and inspecting agency to meet the following requirements:
 - 1. Energy Performance, Aged: Provide roofing system with minimum three-yearaged solar reflectance not less than 0.55 when tested in accordance with ASTM C1549 or ASTM E1918, and in addition, a minimum three-year-aged thermal emittance of 0.75 when tested in accordance with ASTM C1371 or ASTM E408.
 - a. Where tested aged values are not available for proposed product, submit calculations to adjust initial solar reflectance to demonstrate compliance as indicated in ASHRAE 90.1-2013 Addendum F.
 - b. Alternatively, provide roofing system with minimum three-year aged Solar Reflectance Index of not less than 64 when determined in accordance with the Solar Reflectance Index method in ASTM E1980 using a convection coefficient of 12 W/m2K (2.1 BTU/h-ft2).
- C. Roofing system design standard requirements:
 - 1. Recommendations of the NRCA applicable to sheet roofing for storage, handling and application.
 - 2. Recommendations of FM Approvals 1-49 Loss Prevention Data Sheet for Perimeter Flashings.
 - 3. Recommendations of ANSI/SPRI ES-1 for roof edge design.
 - 4. Roofing System Design: Provide roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist uplift pressure calculated according to ASCE 7.
 - 5. FM Approvals Listing: Provide roofing membrane, base flashing, and component materials that comply with requirements in FM Approvals 4450 and FM Approvals 4470 as part of a roofing system and that are listed in FM Approvals "RoofNav" for Class 1 or noncombustible construction, as applicable. Identify materials with FM Approvals markings.
 - a. Fire/Windstorm Classification: Class 1A-120.
 - b. Hail Resistance: MH.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications:
 - 1. A firm with a minimum of three (3) years' experience in type of work required by this section.
 - 2. A firm licensed or approved in writing by manufacturer to perform work under warranty requirements of this Section.
 - 3. Employ full-time supervisors who have worked on roofing projects of similar types and scopes for a minimum of three (3) years.

- B. Inspector Qualifications: Inspection of work by inspector or manufacturer technical representative experienced in the installation and maintenance of the specified roofing system who is, qualified to perform roofing observation and inspection specified in Field Quality Control Article. Inspector is to determine Installer's compliance with the requirements of this Project, and be approved by the manufacturer to issue warranty certification. The Roofing Inspector to be one of the following:
 - 1. An authorized full-time technical employee of the manufacturer, not engaged in the sale of products.
 - 2. An independent party certified as a Registered Roof Observer by the Roof Consultants Institute (RCI), retained by the Contractor or the Manufacturer and approved by the Manufacturer.
- C. Product/Material Requirements:
 - 1. Obtain products from single manufacturer or from sources recommended by manufacturer for use with roofing system and incorporated in manufacturer's warranty.
- D. Pre-Roofing Meeting:
 - 1. Upon completion of roof deck installation and prior to roofing application, hold a pre-roofing meeting arranged by the Contractor and attended by the Roofing Inspector, Material Manufacturers' Technical Representative, Roofing Applicator, Contractor, and Contracting Officer Representative (COR).
 - 2. Discuss specific expectations and responsibilities, construction procedures, specification requirements, application, environmental conditions, job and surface readiness, material storage, and protection.
 - 3. Inspect roof deck at this time to:
 - a. Verify that work of other trades which penetrates roof deck is completed.
 - b. Determine adequacy of deck anchorage, presence of foreign material, moisture and unlevel surfaces, or other conditions that would prevent application of roofing system from commencing or cause a roof failure.
 - c. Examine samples and installation instructions of manufacturer.

1.5 SUBMITTALS:

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, SAMPLES.
- B. Product Data:
 - 1. Primer.
 - 2. Adhesive materials.
 - 3. Membrane sheet roofing and flashing membrane.
 - 4. Roofing cement.

- 5. Roof walkway.
- 6. Fastening requirements.
- 7. Application instructions.
- C. Sustainable Design Submittals, as described below:
 - 1. Volatile organic compounds per volume as specified in PART 2 PRODUCTS.
- D. Samples:
 - 1. Nails and fasteners, each type.
- E. Shop Drawings: Include plans, sections, details, and attachments.
 - 1. Base flashings and terminations.
- F. Certificates:
 - 1. Indicating materials and method of application of roofing system meets requirements of FM Approvals "RoofNav" for specified fire/windstorm classification.
 - 2. Indicating compliance with energy performance requirement.
- G. Field reports of roofing inspector.
- H. Contract Close-out Submittals:
 - 1. Maintenance Manuals.
 - 2. Warranty signed by installer and manufacturer.

1.6 DELIVERY, STORAGE AND HANDLING:

A. Comply with the recommendations of the NRCA applicable to single ply membrane roofing for storage, handling and installation.

1.7 ENVIRONMENTAL REQUIREMENTS:

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.
- B. Provide environmental controls in accordance with Section 01 57 19, TEMPORARY ENVIRONMENTAL CONTROLS.
- C. Provide protection of interior spaces in accordance with Section 01 00 00, GENERAL REQUIREMENTS.

1.8 APPLICABLE PUBLICATIONS:

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only. Editions of applicable publications current on date of issue of bidding documents apply unless otherwise indicated.
- B. American National Standards Institute/Single-Ply Roofing Institute (ANSI/SPRI):

ANSI/SPRI ES-1-03...... Wind Design Standards for Edge Systems Used with Low Slope Roofing Systems

C. American Society of Civil Engineers (ASCE):

ASCE 7-10 Minimum Design Loads for Buildings and Other Structures

D. ASTM International (ASTM):

C67-14 Test Methods for Sampling and Testing Brick and Structural Clay Tile
C140/C140M-14a Test Methods for Sampling and Testing Concrete Masonry Units and Related Units
C1371-04a(R2011)e1 Test Method for Determination of Emittance of Materials Near Room Temperature Using Portable Emissometers
C1549-09(R2014) Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer
D4263-83(R2005) Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method
D4434/D4434M-012 Poly (Vinyl Chloride) Sheet Roofing
D6754/D6754M-10 Ketone Ethylene Ester Based Sheet Roofing
E108-11 Test Methods for Fire Tests of Roof Coverings
E408-13 Test Methods for Total Normal Emittance of Surfaces Using Inspection-Meter Techniques
E1918-06 Test Method for Measuring Solar Reflectance of Horizontal and Low-Sloped Surfaces in the Field
E1980-11 Test Method for Measuring Solar Reflectance of Horizontal and Low-Sloped Surfaces in the Field
American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE)
ASHRAE 90.1-2013 Energy Standard for Buildings Except Low-Rise Residential Buildings, Appendix f.

F. Cool Roof Rating Council:

E.

CRRC-1-08..... Product Rating Program, www.coolroofs.org

G. FM Approvals:

RoofNav	Approved Roofing Assemblies and Products.
4450-89	Approved Standard for Class 1 Insulated Steel Deck Roofs
4470-12	Single-Ply, Polymer-Modified Bitumen Sheet, Built-Up Roof
	(BUR) and Liquid Applied Roof Assemblies for use in
	Class 1 and Noncombustible Roof Deck Construction
1-28-09	Loss Prevention Data Sheet: Design Wind Loads.
1-29-09	Loss Prevention Data Sheet: Above-Deck Roof
	Components
1-49-09	Loss Prevention Data Sheet: Perimeter Flashing

H. National Roofing Contractors Association (NRCA):

Roofing and Waterproofing Manual

I. U.S. Department of Energy (DoE):

Roof Products Qualified Product List, www.energystar.gov

J. Environmental Protection Agency (EPA):

40 CFR 59(2014)..... National Volatile Organic Compound Emission Standards for Consumer and Commercial Products

PART 2 - PRODUCTS

2.1 KEE MEMBRANE ROOFING

- A. KEE Sheet: ASTM D6754/D6754M, fabric reinforced, 1.5 mm (60 mils) thick, with no backing.
 - 1. Color: White.

2.2 ACCESSORIES

- A. Sheet Flashing: Manufacturer's standard sheet flashing of same material, type, reinforcement, thickness, and color as KEE sheet membrane.
- B. Bonding Adhesive: Manufacturer's standard, water based.
- C. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately 25 by 3 mm (1 by 1/8 inch) thick; with anchors.

- D. Metal Battens: Manufacturer's standard, aluminum-zinc-alloy-coated or zinc-coated steel sheet, approximately 25 mm wide by 13 mm (1 inch wide by 0.05 inch) thick, prepunched.
- E. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with FM Approvals 4470, designed for fastening membrane to substrate.
- F. Flexible Walkways: Factory-formed, nonporous, heavy-duty, slip-resistant, surfacetextured walkway pads or rolls, approximately 5 mm (3/16 inch) thick, and acceptable to membrane roofing system manufacturer.
- G. Miscellaneous Accessories: Provide primer, sealers, preformed flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories acceptable to manufacturer.

2.3 ADHESIVE AND SEALANT MATERIALS

- A. General: Adhesive and sealant materials recommended by roofing system manufacturer for intended use, identical to materials utilized in approved listed roofing system, and compatible with roofing membrane.
 - 1. Liquid-type auxiliary materials to comply with VOC limits of authorities having jurisdiction.
 - 2. Adhesives and sealants that are not on the exterior side of weather barrier to comply with the following limits for VOC content when calculated according to 40 CFR 59, (EPA Method 24):
 - a. Plastic Foam Adhesives: 50 g/L.
 - b. Gypsum Board and Panel Adhesives: 50 g/L.
 - c. Multipurpose Construction Adhesives: 70 g/L.
 - d. Fiberglass Adhesives: 80 g/L.
 - e. Single-Ply Roof Membrane Adhesives: 250 g/L.
 - f. Other Adhesives: 250 g/L.
 - g. PVC Welding Compounds: 510 g/L.
 - h. Adhesive Primer for Plastic: 650 g/L
 - i. Single-Ply Roof Membrane Sealants: 450 g/L.
 - j. Non-membrane Roof Sealants: 300 g/L.
 - k. Sealant Primers for Nonporous Substrates: 250 g/L.
 - I. I. Sealant Primers for Porous Substrates: 775 g/L.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions with roofing Installer and roofing inspector to verify compliance with project requirements and suitability to accept subsequent roofing work. Correct unsatisfactory conditions before proceeding with roofing work.
- B. Do not apply roofing if roof surface will be used for subsequent work platform, storage of materials, or staging or scaffolding will be erected thereon unless system is protected.

3.2 **PREPARATION**

- A. Complete roof deck construction prior to commencing roofing work:
 - 1. Install curbs, blocking, edge strips, nailers, cants, and other components where insulation, roofing, and base flashing is attached to, in place ready to receive insulation and roofing.
 - 2. Complete deck and insulation to provide designed drainage to working roof drains.
 - 3. Document installation of related materials to be concealed prior to installing roofing work.
- B. Dry out surfaces, including the flutes of metal deck that become wet from any cause during progress of the work before roofing work is resumed. Apply materials to dry substrates.
- C. Sweep decks to broom clean condition. Remove dust, dirt or debris.
- D. Remove projections that might damage materials.
- E. Existing Membrane Roofs and Repair Areas:
 - 1. At areas to be altered or repaired, remove loose, damaged, or cut sheet that is not firmly adhered only where new penetrations occur or repairs are required.
 - 2. Cut and remove existing roof membrane for new work to be installed. Clean cut edges and install a temporary seal to cut surfaces. Use roof cement and one layer of 7 Kg (15 pound) felt strip cut to extend 152 mm (6 inches) on each side of cut surface. Bed strip in roof cement and cover strip with roof cement to completely embed the felt.
 - 3. At modified bituminous base flashing to be repaired, either bend up cap flashing or temporarily remove cap flashing. Brush and scrape away all deteriorated sheets or surface material of base flashing.

3.3 TEMPORARY PROTECTION

- A. Install temporary protection at the end of day's work and when work is halted for an indefinite period, or work is stopped when precipitation is imminent. Comply with approved temporary protection plan.
- B. Install temporary cap flashing over the top of base flashings where permanent flashings are not in place to provide protection against moisture entering the roof system through or behind the base flashing. Securely anchor in place to prevent blow off and damage by construction activities.
- C. Provide for removal of water or drainage of water away from the work.
- D. Provide temporary protection over installed roofing by means of duckboard walkways, plywood platforms, or other materials, as approved by COR, for roof areas that are to remain intact, and that are subject to foot traffic and damage. Provide notches in sleepers to permit free drainage.

3.4 INSTALLATION, GENERAL

- A. FM Approvals Installation Standard: Install roofing membrane, base flashings, wood cants, blocking, curbs, and nailers, and component materials in compliance with requirements in FM 4450 and FM 4470 as part of a membrane roofing system as listed in FM Approval's "RoofNav" for fire/windstorm classification indicated. Comply with recommendations in FM Approvals' Loss Prevention Data Sheet 1-49, including requirements for wood nailers and cants.
- B. NRCA Installation Standard: Install roofing system in accordance with applicable NRCA Manual Plates and NRCA recommendations.
- C. Manufacturer Recommendations: Comply with roofing system manufacturer's written installation recommendations.
- D. Coordination with related work: Coordinate roof operations with roof insulation and sheet metal work so that insulation and flashings are installed concurrently to permit continuous roofing operations.
- E. Installation Conditions:
 - 1. Apply dry roofing materials. Apply roofing work over dry substrates and materials.
 - 2. Apply materials within temperature range and surface and ambient conditions recommended by manufacturer.

- 3. Except for temporary protection, do not apply materials during damp or rainy weather, during excessive wind conditions, nor while moisture (dew, snow, ice, fog or frost) is present in any amount in or on the materials to be covered or installed:
 - a. Do not apply materials when the temperature is below 4 degrees C (40 degrees F).
 - b. Do not apply materials to substrate having temperature of 4 degrees C (40 degrees F) or less.

3.5 INSTALLATION OF ROOFING

- A. Do not allow the membrane to come in contact with surfaces contaminated with asphalt, coal tar, oil, grease, or other substances which are not compatible with KEE and its adhesion to the substrate.
- B. Install the membrane so the sheets run perpendicular to the long dimension of the insulation boards.
- C. Commence installation at the low point of the roof and work towards the high point. Lap the sheets so the flow of water is not against the edges of the sheet.
- D. Position the membrane so it is free of buckles and wrinkles.
- E. Roll sheet out on deck; inspect for defects as being rolled out and remove defective areas. Allow for relaxing before proceeding.
 - 1. Lap edges and ends of sheets 50 mm (2 inches) or more as recommended by the manufacturer.
 - 2. Heat weld laps. Apply pressure as required. Seam strength of laps as required by ASTM D4434/D4434M.
 - 3. Check seams to ensure continuous adhesion and correct defects.
 - 4. Finish edges of laps with a continuous beveled bead of sealant to sheet edges to provide smooth transition.
 - 5. Finish seams same day as the membrane is being installed.
 - 6. Anchor perimeter to deck or wall as specified.
- F. Repair areas of welded seams where samples have been taken or marginal welds, bond voids, or skips occurs.
- G. Repair fishmouths and wrinkles by cutting to lay flat and installing patch over cut area extending 101 mm (4 inches) beyond cut.

- H. Membrane Perimeter Anchorage:
 - 1. Install metal fastening strip at the perimeter of each roof level, curb flashing, expansion joints and similar penetrations as indicated and in accordance with membrane manufacturer's instructions on top of roof membrane to deck or wall.
 - 2. Mechanically Fastened Metal Fastening Strip:
 - a. Set top of mechanical fastener flush with top surface of the metal fastening strip. Space mechanical fasteners a maximum 305 mm (12 inches) on center starting 25 mm (1 inch) from the end of the nailing strip.
 - b. When strips are cut round corners and eliminate sharp corners.
 - c. After mechanically fastening strip, cover and seal strip with a 152 mm (6 inch) wide roof membrane strip; heat weld to roof membrane and seal edges.
 - d. At roof edge metal, turn the membrane down over the front edge of the blocking or the nailer to below blocking. Secure the membrane to the vertical portion of the nailer; or, if required by the membrane manufacturer, with fasteners spaced not over 305 mm (12 inches) on centers.
 - e. At parapet walls, intersecting building walls and curbs, secure the membrane to the structural deck with fasteners 305 mm (12 inches) on centers or as shown on NRCA manual.
- I. Adhered System:
 - 1. Apply adhesive in quantities required by roof membrane manufacturer.
 - 2. Fold sheet back on itself after rolling out and coat the bottom side of the membrane and the top of the deck with adhesive. Do not coat the lap joint area.
 - 3. After adhesive has set according to adhesive manufacturer's application instruction, roll the membrane into the adhesive in a manner that minimizes voids and wrinkles.
 - 4. Repeat for other half of sheet. Cut voids and wrinkles to lay flat and clean for repair patch over cut area.

3.6 INSTALLATION OF FLASHING

- A. Install flashings as the membrane is being installed. If the flashing cannot be completely installed in one (1) day, complete the installation until the flashing is in a watertight condition and provide temporary covers or seals.
- B. Flashing Roof Drains:
 - 1. Install roof drain flashing as recommended by the membrane manufacturer, generally as follows:
 - a. Coordinate to set the metal drain flashing in asphalt roof cement, holding cement back from the edge of the metal flange.

- b. Do not allow the roof cement to come in contact with the KEE roof membrane.
- c. Adhere the KEE roof membrane to the metal flashing with the membrane manufacturer's recommended adhesive.
- 2. Turn down the metal drain flashing and KEE roof membrane into the drain body and install clamping ring and strainer.
- C. Installing KEE Base Flashing and Pipe Flashing:
 - 1. Install KEE flashing membranes to pipes, wall or curbs to a height not less than 203 mm (8 inches) above roof surfaces and 101 mm (4 inches) on roof membrane.
 - a. Adhere flashing to pipe, wall or curb with adhesive.
 - b. Form inside and outside corners of KEE flashing membrane in accordance with NRCA manual. Form pipe flashing with pipe boot in accordance with NRCA manual.
 - c. Lap ends not less than 101 mm (4 inches).
 - d. Heat weld flashing membranes together and flashing membranes to roof membranes. Finish exposed edges with sealant as specified.
 - e. Install flashing membranes in accordance with NRCA manual.
 - Anchor top of flashing to walls or curbs with fasteners spaced not over 203 mm (8 inches) on centers. Use fastening strip on ducts. Use pipe clamps on pipes or other round penetrations.
 - 3. Apply sealant to top edge of flashing.

3.7 FLEXIBLE WALKWAYS

- A. Use reinforced sheet not less than 915 mm (3 feet) wide.
- B. Heat weld walkway sheet to roof sheet at edges. Weld area 50 mm (2 inches) wide by the entire length of the walkway sheet.
- C. Finish edges of laps with sealants as specified.

3.8 FIELD QUALITY CONTROL

- A. Roofing Inspector: Engage a qualified on site roofing inspector (approved by COR) to perform roof tests and inspections and to prepare start up, interim, and final reports.
 - 1. Examine and probe seams in the membrane and flashing in the presence of COR and Membrane Manufacturer's Inspector.
 - 2. Probe edge of welded seams with a blunt tipped instrument. Use sufficient hand pressure to detect marginal welds, voids, skips, and fishmouths.

- B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.
- C. Notify COR 48 hours in advance of date and time of inspection.
- D. Repair or remove and replace components of roofing work where test results or inspections indicate that they do not comply with specified requirements.
 - 1. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

3.9 **PROTECTNG AND CLEANING**

- A. Protect membrane-roofing system from damage and wear during remainder of construction period.
- B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements; repair substrates; and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of acceptance by COR.
- C. Clean overspray and spillage from adjacent construction. Clean membrane and restore surface to like-new condition meeting solar reflectance requirements.

END OF SECTION

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SECTION 07 56 00 - FLUID-APPLIED ROOFING

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section specifies a fluid applied roofing system, to tie-in the existing PIB roof system and new KEE roof system, consisting of a polyester reinforced fluid application of multiple layers of aliphatic polyurethane.

1.2 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Obtain products from single manufacturer or from sources recommended by manufacturer for use with fluid applied roofing.
- B. Installers Qualifications: Work is to be performed by installer having three (3) years' experience for work relating to this section and approved in writing by fluid applied roofing manufacturer.
- C. Inspections: Manufacturer's technical representative must inspect roof tie in during installation of fluid applied membrane tie-in.

1.3 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Samples:
 - 1. 150 mm (6 inch) square cured sheet of roofing system without backing, showing color, and texture.
- C. Manufacturer's Certificates:
 - 1. Installer approval.
 - 2. Certificate stating that material utilized on the job will be of the same formulation as materials covered by the test report.
- D. Manufacturer's Literature and Data:
 - 1. Roofing system materials giving physical properties, wet mil thickness in relation to dry mil thickness, and other related information.
 - 2. Manufacturer's printed instructions for application of roofing materials to be installed.
- E. Test Reports: Test report from an independent commercial testing laboratory showing that polyurethane materials meet specified requirements.

1.4 **PRODUCT DELIVERY, STORAGE AND HANDLING**

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture,

07 56 00 - 1/4 FLUID APPLIED ROOFING VA Master Specifications 05-15 approval or listing agency markings, and directions for storing and mixing with other components.

- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
 - 1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

1.5 JOB CONDITIONS

- A. Weather Limitations: Proceed with roofing work only when existing and forecasted weather conditions permit Work to proceed without water entering into existing roofing system or building.
 - 1. Store all materials prior to application at temperatures between 60 and 90 deg. F.
 - 2. Apply coatings within range of ambient and substrate temperatures recommended by manufacturer. Do not apply materials when air temperature is below 50 or above 110 deg. F.
 - 3. Do not leave unused felts, coatings or other sheet materials on the roof overnight or when roofing work is not in progress unless protected from weather and moisture and unless maintained at a temperature exceeding 50 deg F.
 - 4. Do not apply roofing in snow, rain, fog, or mist.

1.6 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. ASTM International (ASTM):

D7311 Standard specification for liquid-applied, single pack, moisture-triggered, aliphatic polyurethane roofing membrane

PART 2 - PRODUCTS

2.1 ROOFING MATERIALS

- A. Reinforced fluid-applied membrane shall consist of moisture-triggered aliphatic polyurethane base coat, polyester reinforcement and a moisture-triggered aliphatic polyurethane top coat.
- B. Dry mil thickness of roof membrane to be a minimum 70 mils thick.
- C. Polyurethane roof system is to meet the following requirements:

Property	Test Method	Base Course	Weather Course
Dynamic Puncture	ASTM D7311	800 ft. poundals	800 ft. poundals
Resistance		(35 J)	(35 J)

Property	Test Method	Base Course	Weather Course
Static Puncture Resistance	ASTM D7311	75 lbs. (34 kg)	75 lbs. (34 kg)
Water Vapor Transmission	ASTM D7311	.020 perm-in	.020 perm-in
Accelerated Weathering 5,000 hrs	ASTM D7311	No Visible Cracking or flaking	No Visible Cracking or flaking
Flexibility – Mandrel bend	ASTM D7311	No Visible Cracking or flaking	No visible cracking or flaking
Tear Resistance	ASTM D7311		159 lbf/in (30 kN/m)
Elongation at Break	ASTM D7311		350%
Tensile Strength	ASTM D7311		1,435 lb/in squared
Weight Solids	ASTM 1644	88%	88%

2.2 AUXILIARY MATERIALS

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with existing roofing system and fluid-applied roofing system.
- B. Single Ply Membrane Primer: Single-component primer for preparation of single ply membrane roofing and flashings to promote base coat adhesion.
- C. Metal Surface Primer: Single-component, water based primer to promote adhesion of base coat to metal surfaces.
- D. Reactivation Primer: Single component urethane primer to promote adhesion of additional urethane coatings layers over cured urethane coating layers.

PART 3 - EXECUTION

3.1 **PREPARATION OF SURFACE**

- A. Verify that surfaces to receive roofing and flashing are in sound condition and free of projections, depressions, grease, oil, asphalt, tar, paint, wax, dust, or other debris that may prevent proper application of roofing.
- B. Verify adhesion of membrane to substrate by performing a pull test. Allow 24 hrs to cure and test before proceeding with work.

3.2 CLEANING

A. Broom, scrub clean, existing PIB Membrane to ensure no dust, dirt, loose aggregate, or other foreign particles are left on existing membrane. A power washing course may be necessary to get membrane sufficiently clean.

(Don't think power washing on this small of an area will be necessary but add it just in case.)

3.3 APPLICATION

- A. Install roofing with tools and equipment approved by roofing material manufacturer. Wet film thickness of roofing materials to be as recommended by roofing material manufacturer to obtain the specified dry film thickness. Check wet film thickness frequently by use of a wet mil thickness gauge. Control application of fluid-applied material by maintaining careful balance at all times between material consumption and area covered. Apply quantity of coats to achieve minimum dry film thickness of polyurethane base and top coat.
- B. Substrate Priming:
 - 1. Apply compatible primer at rate recommended by manufacture over existing clean and dry substrate. Allow the primer to completely dry prior to applying base coat. Keep foot traffic to a minimum on primed surfaces.
- C. Fluid Applied Membrane Application:
 - 1. Apply Base coat at recommended manufactures coverage rate to achieve a minimum wet mil thickness.
 - a. Extend base coat a minimum of one foot onto existing PIB roof and new KEE roof system
 - 2. Embed polyester reinforcement into wet base coat and roll surface of polyester to completely embed and saturate fabric. Allow to cure per manufactures recommendations.
 - 3. Apply surfacing coat to cured base coat at recommended manufactures coverage rate to achieve a minimum wet mil thickness. Check with manufacture and installation guidelines if primer is required between coats.
 - 4. The minimum total dry mil thickness of the urethane system shall be at least 70 mils thick.

3.4 PROTECTION AND CLEAN UP

- A. Keep completed roofing system free of non-essential traffic and unrelated work until at least 48 hours after completion of roofing application.
- B. Provide temporary support, such as insulation board, for materials and equipment stored on roof during application.
- C. Protect adjacent construction from disfiguration by run, spillage or overspray, and repair work defaced in this manner.
- D. Remove tools, equipment and surplus materials and clear roof area of debris on completion of work.

3.5 REPAIRS

A. Repair damage to fluid applied membrane before work is complete. Patch deficient areas with matching polyurethane system.

END OF SECTION 07 56 00









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Drawing Title	Project Title			Date
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