Gary and Mary West Wellness Center Scope of Work Roofing Recoat and Flooring Replacement Owner's Specifications

Roofing Recoat

These specifications serve as a project specific supplement to Carlisle Roof Foam and Coatings- Spray Polyurethane Foam (SPF) Information dated October 2019. Manufacturer's recommended installation procedures will become the basis for accepting or rejecting actual installation procedures.

Submittals

Contractor shall submit to the building owner's representative 7 days prior to time of bid:

A. Any proposed product substitutions with substantiation of product equivalency in quality, durability and warranty offered.

Contractor shall submit to the building owner's representative prior to beginning work:

A. Shop drawings as applicable.

Existing conditions:

EXAMINATION

Inspect existing surfaces to ensure that they are clean, smooth, sound, properly prepared, and free of moisture, dirt, debris, or other contamination.

A. Verify that all roof penetrations, mechanical equipment, cants, and edge metal are in place and secure.

B. Ensure all critical areas around the immediate vicinity of the spray area are adequately protected.

C. Verify all roof drains are clean and in working order.

D. Verify that all air conditioning and air intake vents are temporarily sealed or closed.

E. Verify that all roof areas maintain positive drainage to appropriate receptacles and roof drains.

1. Leak Investigation

a. Begin leak investigations by conducting a thorough, visual inspection of the general location on the roof where leaks have been detected inside the building.

b. Check areas around mechanical rooftop equipment, drains, edge metal, curbs, expansion joints, pipes, etc. to identify cuts, punctures, or other forms of damage.

c. Explore the condition of metal flashing (i.e., edging, coping, expansion joint covers, etc.) for improperly sealed joints.

Recoating of SPF Roofs

Information contained in this attachment are prepared solely for the purpose of maintenance of an existing coating system and not intended for correction to badly deteriorated roof system that may require replacement. These guidelines are intended for a sound SPF system that is well adhered and not contaminated with moisture. CRFC specification for coating restoration shall be referenced for roofs not in compliance with the conditions state here.

General Recoating Considerations

Apply coating in strict accordance with published applicable regulations of the manufacturer and local, state, or federal agencies which have jurisdiction.

A. Coordinate with designer/owner for desired colors for field & walkways and solar reflectivity, where required.

B. When SPF and coating have been utilized to form the existing walkways, recoat surface to contrast the roof color for ease of identification

C. Working within the recommended temperatures and humidity levels, apply coating and work from the high points of the roof towards the low areas of the roof.

D. Adhesion tests are required for aged coatings to ensure new coating is properly adhered (2.0 pli min). If necessary, utilize appropriate primer to enhance the adhesion of the new coating.

E. Do not proceed with application of coating or sealing materials when temperature is below product specified minimum. No coating system shall be applied if weather will not permit it to dry prior to exposure to precipitation or freezing.

F. Do not apply materials unless surface to receive roofing system is clean, dry and prepared as specified.

G. Existing acrylic and silicone coated surfaces must be cleaned with Prime-Tek Membrane Cleaner and pressure washed prior to new coating application.

H. For asphaltic roof coating - apply Prime Tek Bleed block Primer. This can be used as a prime coat over modified bitumen, BUR and other asphaltic substrates. The product can be applied to wide range of substrates which include, but are not limited to, wood, metal, concrete and masonry.

I. Existing HVAC, Ductwork, piping, and other roof top equipment shall be protected in place. Protection components from concentrated loads such as Sleepers and protection pads shall be maintained or replaced to prevent damage to foam and coating.

Coatings Options:

NOTE: SeamlesSEAL TC can be used as a top or base coating or in single coat applications. SeamlesSEAL BC can be used as a basecoat in two coat applications but is not recommended as the top or finish coating.

B. SeamlesSEAL Ultra Silicone Coating, is a single-component, moisture-cured, fluid-applied silicone coating. The coating comes in a variety of types (listed below). It is easy to apply and once cured, the silicone coating membrane offers resistance to water intrusion, UV exposure, and natural weathering.

The SeamlesSEAL Ultra Silicone coating is available in low solids (LS), high solids (HS) and high solids with low VOC (HSLV).

NOTE: Acrylic coatings are not compatible over silicone (coatings, sealants or mastics).

C. Verify Existing coating is compatible with proposed Silicone coating

PREPARATION

All surfaces to be coated must be clean, sound, dry and free of any dirt, grease, oil, debris or other contaminants that may interfere with proper adhesion.

Pay particular attention to the low areas on the roof, where more contaminants may have settled.Low areas are to be reworked to ensure positive drainage.

Loose coating shall be removed prior to application of new coating. Any wet areas must be removed and/or dried out prior to application of coating.

A. Small areas where SPF is found, Broom areas that are small to remove the degraded SPF prior to sealant and coating application.

B. Fill voids and seal cracks holes or other surface imperfections with the applicable CRFC mastic.

C. Caulk or fill all cracks, holes or other surface imperfections with a high quality elastomeric sealant or mastic designed for roofing applications.

D. Allow sealant/mastic to thoroughly dry before application of coating.

E. Foam removal for large area repairs

Large damaged and deteriorated areas must be repaired by the removal of the existing coating and wet SPF.

i. Use mechanical scarifying equipment to remove damaged SPF to a minimum depth of 1/2"or until dry SPF is reached, whichever is greater. Removal of SPF by hand is not acceptable.

ii. Large or deep areas of foam removal will require the application of additional foam prior to coating. Apply a minimum of 1/2" new SPF. Do not remove an area more than what can be re-foamed and cover by the base coated in the same day.

iii. Areas where the foam has been replaced should receive an additional application of CRFC coating beyond the specified coating thickness.

Roof Cleaning

Some roofs may require cleaning for aesthetic concerns or if the roof is in a very dirty environment.

Extreme care should be exercised to prevent damage to the roof. Most often power washing with clean water will remove most accumulated dirt, a soft broom may be used to assist in the cleaning. Use a large volume of water and as low a pressure setting as possible to gently perform the cleaning. Power washer at 800-1000 psi with a Wide Fan Tip recommended by manufacturer.

Removal of other contaminants may require the use of a safe and biodegradable cleaning agent. Algae growth may require the use of an approved solution, such as a mild chlorine solution, diluted with water. A complete rinse clean water is required after the use of any chemicals or cleaning agent.

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Valleys, low areas, and those areas of the existing coated surface where heavy soiling/discoloration has been observed should be infilled with spray foam coating and targeted for additional layer of coating to safeguard against slow drainage.

A. After thorough preparation of the existing surface, the entire roof shall receive minimum two coats of CRFC coating to the desirable DFT.

B. The base coat of SeamlesSeal Silicone bleed block should be evenly applied at the rate of 1 1/2 gallons per 100 square feet by spray or using a roller. If spraying, backroll the first coat. Apply enough pressure on the roller to work the coating into all the rough areas of foam.

C. Allow the first coat to dry thoroughly, approximately 4 to 12 hours, prior to the application of the second coat.

D. Treat All seams, penetrations, and damaged areas with microfiber of fabric reinforced SeamlesSeal Silicone Coating- Ultra HSLV (Microfiber MAstic yields: 60 DFT =37-50 linear feet at 4"wide)

E. The second coat should be evenly applied at the rate of 1 1/2 gallons per 100 square feet by spray or using a roller. Ensure to apply passes in a crosshatch pattern to ensure consistent coverage.

F. Heavy puddles of coating should not be left on the roof. All coatings should be distributed evenly at the specified rates of coverage.

G. Final minimum thickness of 25 mils DFT of Silicone coating for a minimum warranty term of ten years.

3.03 POLYURETHANE FOAM APPLICATION

A. All objects that require protection from overspray shall be protected and all air intake vents shall be turned off and

temporarily sealed.

B. Apply the polyurethane foam in strict accordance with CRFC's specifications and application instructions, using spray

equipment recommended by CRFC.

C. Polyurethane foam shall be applied in a minimum of 1/2-inch thick passes. The total thickness of the polyurethane foam shall

be a minimum of

inches, except where tapering is required to facilitate drainage.

D. Apply the full thickness of polyurethane foam in any area on the same day.

E. The polyurethane foam shall be terminated neatly a minimum of 4 inches above the finished roof surface at roof

penetrations. Foamed-in-place cants shall be applied to allow a smooth transition from the horizontal to vertical surface.

F. The finished polyurethane foam surface texture shall be "smooth to orange-peel", free of voids, pinholes and depressions. "Verge of popcorn" texture is acceptable if it can be thoroughly and completely coated at details and edges.

Caution: Popcorn and tree bark textures are not acceptable. Unacceptable polyurethane foam textures shall be removed, and new foam replied.

3.08 Daily Seal

SPF application shall be limited to that which can be completed to full SPF thickness in the same day. All exposed foam tie-in end laps and side laps must be primed at the end of each workday. Prime-Tek General Purpose Silicone Primer. If the SPF is not applied over the primed area within 72 hrs the primer must be reapplied and allowed to fully dry before continuing work. Refer to Spec Supplement S-05-19 "Equipment Shut Down and Clean Up".

PRODUCTS

Premier+70 spray Polyurethane foam or equal, Follow Carlisle Roof Foam and coatings Specifications. Installation instructions including surface preparation and application measures attached for reference

Seamless Seal Ultra silicone Coating available in low solids, high solids and high solids with low VOC (HSLV)

CLEAN-UP: Refer to Spec Supplement S-05 "Equipment Shutdown and Clean UP".

<u>SAFETY</u>

The roofing surface may be slippery when wet. Exercise caution when walking on the roof, particularly while walking on the light-colored surfaces, since ice or frost build up may not be visible. Always exercise care while on a roof and follow a roof safety and fall protection program.

1. Exercise care with tools and equipment to avoid damage.

2. When servicing rooftop units, care should be exercised when placing metal doors, lids, pans, or sharp objects on the roof surface.

When moving or replacing units or equipment on roofs, avoid overloading and damaging the roof system by protecting the surface of the work area with smooth sheets of plywood. The plywood must be weight to prevent displacement by wind and immediately removed after use.
During snow removal avoid damaging the surface by using plastic shovels and exercise care

when working around curbs, walls or other penetrations to avoid damaging to areas. Snow blowers and shovels with sharp edges must not be used.

5. Clear the roof surface from all debris (such as, glass, bolts, nails, screws, metal shavings, etc.) and any other materials that may promote punctures or cuts to the system.

6. Remove all spills and foreign materials which may degrade the roof (such as solvents-based materials, oil based paint, etc.)

Walking Roof Pads

A. Walkways Options:

- 1. Secondary roof coating of different color with embedded granules.
- 2. Factory-made breathable walkways as approved by CRFC.
- B. Walkways Limitations & Cautions:
 - 1. Secondary roof coating as a walkway is included in CRFC's warranty.

2. Contractor must follow Occupational Safety and Health Administration (OSHA) recommendations to allocate the locations of walkway.

4. See Path of Travel sketch for suggested walkway location. Contractor to verify if alternate path options exist. Path of travel should reach each piece of rooftop HVAC and exhaust equipment. Path shall extend to the working panel of each piece of equipment. Path should traverse the route with a minimum number of obstructions and tripping hazards. When estimating path distance, allow for an additional 100 linear feet of path in addition to the path shown.

C. Scope of Work:

1. Walkways are to be specified at all traffic concentration points (i.e., roof hatches, access doors, rooftop ladders, etc.), and if regular maintenance (once a month or more) is necessary to service rooftop equipment. PremiR+ 60 and PremiSEAL 60 or 70 are the recommended SPF products for use.

2. Where applicable, a weather-resistant, breathable, resilient pad composed of synthetic rubber strands or other suitable material shall be installed to create protected surface over the SPF and coating system. Walkway shall consist of a different color to provide contrast against coated surface. CRFC may be contacted for a list of walkways acceptable for use.

3. As an option, a walkway system can be formed by an additional layer of spray coating and granules. A contrasting color to the coating shall be selected so that the walkway system can easily be identified. Installation details attached at the end of this section shall be referenced, F-25.

EXISTING DUCTWORK - COATING

Thoroughly clean existing ductwork on roof, verify for deterioration and bring to attention of owner. Extreme care should be exercised to prevent damage to the ductwork. Most often gentle

washing with clean water will remove most accumulated dirt, a soft broom may be used to assist in the cleaning.

Removal of other contaminants may require the use of a safe and biodegradable cleaning agent. Algae growth may require the use of an approved solution, such as a mild chlorine solution, diluted with water. A complete rinse clean water is required after the use of any chemicals or cleaning agent.

Spray protective top coating to completely coat ducts, HVAC equipment and attachments.

- C. CLEAN UP
- 1. Walk the site and make sure everything is picked up, put away and secured.
- 2. Account for all workers and record the days activities.
- 3. Perform required maintenance.
- 4. Open up plugged roof drains.
- 5. Make sure roof is in watertight condition before leaving.

6. Take empty containers off site to properly dispose of completing the proper paperwork before transporting.

7. Tie down or secure items that could move due to inclement weather or high winds.

- 8. Check areas for large masses of foam either in bags or on scrap materials
- a. If found break up to dissipate heat.
- 9. Properly coil up and secure hoses.
- 10. Complete the necessary paperwork for record keeping.

3.07 FIELD QUALITY CONTROL

A. Core samples, of the roof system, shall be secured at project completion at the rate of one core per 10,000 square feet (minimum of 2 cores per roof) by an independent inspection firm to test for foam thickness, compressive strength, density and adhesion.

B. Slit samples shall be taken, to test the coating thickness and coating adhesion. Three slit samples are required for every 10,000 square feet of roof area (minimum of 6 samples collected per roof). Areas where samples were taken, must be

repaired with appropriate sealant and replacement of foam cores.

C. During application, the contractor must exercise periodic quality control to ensure adequate adhesion and thickness of the foam and coating:

1. Using a probe, the insulation thickness shall be verified at frequent and random locations.

2. The polyurethane foam shall be examined for adhesion and thickness by removing cores at a rate of 1 every 10,00 feet.

3. After the coating application has cured, the contractor shall remove slits to examine adhesion of the coating to the foam and verify the dry millage of the applied coating.



Carlisle Roof Foam and Coatings Spray Polyurethane Foam (SPF)

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Note: In addition to information listed in this section Specifiers and Authorized applicators should reference Spec Supplement and Design Reference Sections for other pertinent information.

Carlisle Roof Foam and Coatings Spray Polyurethane Foam (SPF)

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Information contained in this specification represents a part of Carlisle's requirements for obtaining a roofing system warranty. Construction materials and practices, building siting and operation, climatic conditions, and other site-specific factors will have an impact on the performance of the spray polyurethane foam (SPF) roofing system. Carlisle Roof Foam and Coatings (CRFC) recommends that the building owner retain a design professional to determine appropriate design measures to be taken in order to address these factors.

This section is to serve as criteria for Specifiers and Authorized Applicators regarding the design and installation of Carlisle's PremiR+ and PremiSEAL Roofing Systems. Additional information essential for the design and installation of the roof system mentioned herein are also included in the Design Reference Section and listed in the form of a Specification Supplement at the end of the Technical Manual. Specifiers and Authorized Applicators are advised to reference all applicable sections.

A Warranty Table has been included in Paragraph 1.05 citing various requirements by which specific warranty coverage can be obtained.

Information regarding recoating and applicable warranty terms are included in the attachment at the end of this section.

PART I GENERAL

1.01 Description

The Carlisle Roof Foam and Coatings SPF roofing system, is a spray-in-place closed-cell polyurethane foam (SPF). The system incorporates either PremiR+ (HFO-blowing agent) or PremiSEAL (HFC-blowing agent) twocomponent foam applied to achieve the desirable thickness/R-value. The system is completed by covering the SPF with an elastomeric coating of either acrylic or silicone with optional granules imbedded (approximately 30-40lb/100 square feet).

The SPF may be applied directly to the structural deck, approved insolation, cover boards, or in certain applications over an existing membrane. Priming is strongly recommended to enhance adhesion and improve the system wind performance. The completed system is fully adhered, self-flashing, and monolithic coatings that enhance long turn weatherability, reflectivity, and energy performance.

Slope can be obtained by utilizing tapered panels beneath the SPF or by the application of multiple passes to create the desired slopes.

Consult product data sheets for complete information on SPF, and the various available coatings. Part II of this specification includes summary information on physical properties as shown in tables, included in Part II.

The CRFC SPF roofing system may be eligible for a system warranty for 10, 15 or 20 year duration if installed by a CRFC Authorized Applicator. Refer to paragraph 1.05 for applicable warranty requirements and other available coverages.

1.02 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 if the existing roofing system is to remain in place.
- B. Coordination between various trades is essential to avoid unnecessary rooftop traffic over completed sections of the roof and to prevent possible damage to the SPF and coating system.
- C. Concentrated loads from rooftop equipment may cause damage to the SPF and coating if proper design is not utilized. Equipment should be mounted on curbs. Protection pads or sleepers may be incorporated under lighter weight equipment.
- D. The white SeamlesSEAL Ultra HS and white SeamlesSEAL Ultra LS coatings meets the ENERGY STAR[®] Roofing Products program guidelines for energy efficiency and listed on the Cool Roof Rating Council, CRRC. Energy savings is climate specific and may vary significantly from building to building and by geographic location. Increasing thermal efficiency by increasing thickness of the SPF is a sure and more sustainable method to maintain energy savings.
- E. Drainage must be evaluated by the specifier in accordance with all applicable codes. Slope may be provided by tapering the insulation or the use of crickets and saddles to divert water towards properly located roof drains. Slope may also be formed using multiple passes of SPF. Ponding water that could remain after 48 hours should be eliminated by incorporating of roof drains as mandated code.
- F. On **new construction** projects, especially in cold climate regions, moisture generated due to the construction process could adversely impact the roofing assembly if not addressed. [Refer to Design Reference Dr-04-19 "Construction Generated Moisture" included in the CRFC Technical Manual.]

Note: Structural concrete decks (light or normal weight), must have a dry surface and moisture content must be verified to insure proper foam adhesion. Follow relative humidity test (ASTM F2170) to quantify relative humidity level below concrete surface.

- G. On **new or tear off** projects with steel or wood decks, the deck may be overlaid with a CRFC cover board to serve as a foam underlayment. When direct application is desired the SPF can be applied directly to the steel deck or directly to exterior grade plywood decks after sealing joints and gaps as shown in the details at the end of this section. Projects with wood plank decks (new or tear off) may be overlaid with 7/32" thick exterior grade plywood or a cover board to counter movement usually experienced. The plywood/cover board must be properly secured and stable to prove a stable substrate for the SPF.
- H. On **retrofit** projects, SPF roofing system may be applied directly existing types of roofing membranes providing the existing system is free of moisture and they are securely attached. Refer to Part III for additional substrate preparation.

CAUTION: If left unaddressed, existing moisture could weaken roof system and increase the probability of mold growth.

1.03 Quality Assurance

Building codes are above and beyond the intended purpose of this specification. The building **owner**, **owner's representative** or **Specifier** should verify local codes for applicable requirements and limitations. It is the responsibility of the specifier to review local, state and regional codes to determine their impact on the specified CRFC System.

Note: For code approvals achieved with this SPF system consult the applicable code publication or contact CRFC.

- A. The SPF must be installed by a CRFC Authorized Applicator in compliance with specification and details as approved by CRFC. Subcontracting out the installation of the coating/SPF is not allowed.
- B. Roofing applicator must have a minimum of 2 years work experience with SPF and must have installed a minimum of 250,000 sq. ft. experience with SPF roofing systems, with projects of a similar scope and nature.
- C. CRFC strongly recommends participation in a Pre-Bid Conference to discuss any details not covered within the specification. Participants must access the roof to increase their familiarization with all conditions and the normal flow of activities at the facility.
- D. Prior to the issuance of the roofing system warranty and upon completion of all work inspection must be requested and shall be performed by an employee or representative designated by CRFC. 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.
- E. There must be no deviations made from this specification without the PRIOR WRITTEN APPROVAL of CRFC. Alternate accessory products, if considered, shall be submitted to the owner's representative 10 days prior to bid date to facilitate a thorough review. This shall include, product data sheets, manufacturer's references, warranty samples, inspection policy, safety data sheets (SDS), and, if necessary, a physical sample (3' x 3').
- F. Refer to specification supplement and the Design Reference sections for other related design and application information.

1.04 Submittals

- A. CRFC Authorized Applicator shall submit to the building owner's representative at or before time of bid:
 - 1. Reference projects with contacts, substantiation of years of experience and completion of minimum prior work submitted by applicator.
 - 2. Sample copy of warranty.
 - 3. Underwriters Laboratory, UL 790 classification, or Factory Mutual, and local building code approvals as required/specified.
 - 4. Product technical data sheets, SDS, shop drawings as applicable.

- B. When the roofing system warranty is considered, the CRFC Authorizes Applicator shall submit to CRFC a completely executed "request for roofing warranty" along with:
 - 1. Project specification
 - 2. Preinstallation pictures
 - 3. Detailed roof drawing including roof penetrations, curbs, perimeter details, drains, and saddles or crickets if applicable.
- C. A completely executed notice of completion must be submitted to CRFC to schedule the necessary inspection and acceptance of the project prior to issuance of the Carlisle warranty.

1.05 Warranty

- A. A total system warranty is available for additional charge and applies only to products manufactured or marketed by CRFC. The total system is defined as the coatings, SPF, primers, fabrics, adhesives, sealants, mastics and additives. Subject to the terms, conditions and limitations listed on the warranty form, CRFC will be responsible to repair leaks resulting from material and/or workmanship deficiency, for the duration of the warranty period.
- B. The duration of the total system warranty will vary between 10, 15 and 20 years, depending on the dry mil thickness of the protective coating and over all thickness of the SPF.

Note: Extended wind speed coverage is available for an additional charge and can be issued regardless of the warranty duration. Contact CRFC for more information on this or other available warranties.

- C. A material warranty is available at no charge and covers against premature deterioration and failure due to weathering of products manufactured or marketed by CRFC. Material covered under this warranty include coatings, SPF, primers, fabrics, adhesives, sealants, mastics and additives (this warranty does not include labor).
- D. The table below includes minimum guidelines that must be complied with to obtain the specific warranty duration and type of coverage:

Warranty	System Warranty					
Duration	Silicone Coatings*	Acrylic Coatings*	PremiR+/PremiSEAL SPF	Compressive Strength**		
10 Year	20 mils	25 mils	1 inch	40, 60, 70 psi		
15 Year	25 mils	30 mils	1-1/2 inch	40, 60, 70 psi		
20 Year	30 mils	40 mils	1-1/2 inch	40, 60, 70 psi		

*Total minimum dry film mil thickness

**60 and 70 psi recommended for high traffic roofs (70 psi only available in PremiSEAL)

Note: Contact CRFC for other available coatings and SPF with compressive strength greater than 70 psi.

E. Access for Warranty Service

It shall be the owner's responsibility to expose the roof system in the event that warranty service is required when access is impaired. Such impairment includes, but is not limited to:

- 1. Design features, such as window washing systems, which require the installation of traffic surface units in excess of 80 pounds per unit.
- 2. Any equipment, ornamentation, building service units and other top surfacing materials which are not defined as part of this specification.
- 3. Photovoltaic and Mounting Systems or other Rooftop equipment that does not provide CRFC with reasonable access to the roofing system for purposes of warranty investigation and related repairs.

CAUTION: Applications such as walking decks, terraces, patios or areas subjected to conditions not typically found on roofing systems are **not** covered by this specification and not eligible for roofing system warranties as stated herein.

4. The formation or presence of mold or fungi in a building is dependent upon a broad range of factors including, but not limited to, the presence of spores and nutrient sources, moisture, temperatures, climatic conditions, relative humidity, and heating/ventilating systems and their maintenance and operating capabilities. These factors are beyond the control of CRFC and CRFC shall not be responsible for any claims, repairs, restoration or damages relating to the presence of any irritants, contaminants, vapors, fumes, molds, fungi, bacteria, spores, mycotoxins, or the like in any building or in the air, land, or water serving the building.

1.06 Job Conditions

- A. Prior to application of the SPF, the temperature of the substrate shall be between 45°-120°F (7°- 49°C). The service temperature of any surface to be sprayed shall not exceed 180°F (82°C).
- B. Moisture in the form of rain, fog, frost, dew or relative humidity >85% will adversely affect the SPF. Do not apply SPF when these conditions exist.
- C. Wind speeds in excess of 10 mph may adversely affect the SPF surface texture, cure and physical properties as well as cause possible overspray problems. When wind is 3 mph or greater, use windscreens to prevent possible overspray.
- D. All roof surfaces must be properly drained, saddles and crickets may be installed at scuppers and drain to facilitate drainage and reduce ponding.
- E. To prevent surface contamination from SPF and coating overspray, mask areas where SPF or coating is to be terminated.
- F. Chemical compatibility will depend on type of SPF and coating used. CRFC should be contacted for verification of compatibility with chemicals or specific waste products that may come in contact with the roofing system.

1.07 Product Delivery, Storage and Handling

- A. Deliver materials to the site in their original, tightly sealed containers, all clearly labeled with manufacturer's name, product identification and lot number.
- B. Safely store materials in their original containers out of the weather, keep dry and within the temperature limits specified by the manufacturer. Storage temperatures for CRFC Roofing Products are between 50°-80°F (10°-27°C) minimum for 48 hours before use. Refer to PDS for additional information.
- C. All materials shall be stored in compliance with applicable fire and safety requirements.
- D. Protect materials from damage during transit, handling, storage and installation.
- E. Proper storage is important before and during use, on the job site. Improper storage conditions can make the components unusable.
 - 1. Keep "A" and "B"- component drums dry and at proper temperatures.
 - 2. Maintain a tight seal on "A" and "B"- component containers to protect against moisture or direct contact with water.
- F. If loading materials onto the roof, the CRFC Authorized Roofing Applicator must comply with the requirements of the specifier/owner to prevent overloading and possible disturbance to the building structure.

PART II PRODUCTS

2.01 General

The product components of this Carlisle Roof Foam and Coating (CRFC) Roofing System are composed of CRFC products or those accepted by CRFC as compatible with this roofing system. The installation, performance or integrity of products by others, **when selected by the specifier and accepted as compatible**, is not the responsibility of CRFC and is expressly disclaimed by the CRFC Warranty.

2.02 Spray Foam (PremiR+ and PremiSEAL)

Rigid HFO-blown closed cell (PremiR+) and HFC-blown closed cell (PremiSEAL) SPF can be utilized over the structural deck or on recover application. The PremiR+ provides greater R-value and tenacious adhesion resulting in superior wind uplift resistance. Products are available in compressive strengths of 40, 60, 70, or 80 psi, as outlined in the following tables.

A. PremiR+

PremiR+ is a rigid HFO-blown closed cell SPF roofing system. PremiR+ is a 2 component SPF consisting of Carlisle "A" component and PremiR+ "B" component resin. PremiR+ provides a superior R-value of 6.6 per inch and a continuous insulation without thermal breaks. The PremiR+ SPF roofing system provides excellent self-adhering qualities with superior wind uplift, is self-flashing, seamless and with its closed cell nature provides a durable leak resistant roofing system. The PremiR+ roofing system can be used in most retrofit or new construction roofing applications. The PremiR+ has low global warming potential (LGWP).

Physical Property	Test Method ASTM	PremiR+ 40	PremiR+ 60
Compressive strength, psi	D 1621	40-45	55-60
Closed-cell content, percent	D 6226	94	94
Tensile Strength, psi, min	D 1623	55-65	65-75
K-factor, aged, max	C 518	0.156	0.156
R-Value per inch	C 518	6.6	6.6
Core Density lb/c.f.	D 1622	2.4-2.6	2.7-2.8
Dimensional Stability, 28 days, Percent volume change, max.	D 2126	<4	<4
Water Absorption %	C 2842	0.6	0.6
Flame spread, max.	E 84	20	20

B. PremiSEAL

PremiSEAL is a two-component, one to one by volume, SPF. The PremiSEAL liquid "A" component (ISO) and "B" component (Resin) are mixed through specialized proportioning spray equipment to produce a fast curing rigid foam plastic insulation. PremiSEAL provides an R-value of 6.3 per inch and a continuous insulation without thermal breaks. PremiSEAL utilizes an EPA approved, zero ozone depleting blowing agent.

Physical Property	Test Method ASTM	PremiSEAL 40	PremiSEAL 60	PremiSEAL 70	PremiSEAL 80
Compressive strength, psi	D 1621	40-45	50-60	55-65	80-85
Closed-cell content, percent	D 6226	94	94	94	94
Tensile Strength, psi, min	D 1623	55-70	65-75	65-80	90
K-factor, aged, max	C 518	0.158	0.158	0.158	0.158
R-Value per inch	C 518	6.3	6.3	6.3	6.3
Core Density lb/c.f.	D 1622	2.4-2.6	2.8-2.7	2.9-3.0	3.5
Dimensional Stability, 28 days, Percent volume change, max.	D 2126	<4	<4	<4	<4
Water Absorption %	C 2842	0.6	0.6	0.6	0.6
Water Vapor Permeability perms @ 1in	E96 (A)	1.4	1.4	1.4	1.4
Flame spread, max.	E 84	40	40	40	40

Note: Consult product data sheet pertaining to use of these products and latest property data.

2.03 High Density Insulation/Cover Board

A. Securock Cover Board – A uniform composition of fiber-reinforced gypsum, without a facer, for use as a

cover board or a thermal barrier. Available in 1/4'' to 5/8'' thick and $4' \times 4'$ or $4' \times 8'$ size boards. Long uninterrupted runs (>200') may require slight gapping due to thermal expansion.

B. **Dens Deck Cover Board** – gypsum core that incorporates glass-mat facings on the top and bottom side for use as a cover board. Available in 1/4" and 1/2" and 4' x 4' or 4' x 8' size boards.

Note: Both products can be used to cover steel and wood decks or provide stable substrate for the application of the SPF and for the purpose of code compliance.

C. SecurShield HD FR – Designed for direct application to combustible decks, this rigid insulation panel composed of a high-density (109 psi max), closed-cell polyisocyanurate foam core laminated to coated-glass fiber-mat facer for use as a cover board over wood substrates to comply with local fire codes or to cover surface irregularity resulting from tear-off. Achieves a UL 790 Class A combustible deck assembly rating without the need for fire-rated slip sheets or thermal barrier products. Available 1/2" thick 4' x 8' panel weight 11 lbs with an R-value of 2.5.

2.04 Tapered insulation/ board stock

Carlisle SecurShield Polyisocyanurate – A foam core insulation board covered on both sides with a coated glass fiber mat facers meeting ASTM C 1289-06, Type II, Class 2, Grade 2 (20 psi) or Grade 3 (25 psi). The product is available in 4' x 4' tapered panels. 4' x 8' boards with a thickness from 1" to 4" are also available. Used for construction of crickets and saddles and where fill be needed. Contact CRFC for approved alternatives.

2.05 Primers and Coatings

Below is a brief description of products used as primers and coatings for the SPF system. Additional information can be found in the applicable product data sheets or by referencing Spec Supplement S-04-19 (Primers and Coatings).

A. Prime-Tek Epoxy Primer

This two part primer is intended for use on most metals, organic polymers, wood, and masonry. It may also be used as masonry block filler and is limited for applications where temperatures are between 50°F (10°C) and 130°F (54°C).

B. Prime-Tek Acrylic General Purpose Primer

This general purpose primer can be applied over built up roofing, metal substrates, structural concrete (cured at least 30 days), SPF, and masonry surfaces. If left exposed for more than 48 hrs, a fresh, new coat must be applied.

C. Prime-Tek Bleed Block Primer

The Prime-Tek Bleed Block primer is rust-inhibiting and is used over modified bitumen or asphaltic substrates and to protect metal surfaces. This product can also be used over wood decks, structural concrete, masonry, and some single-ply membranes.

D. Coatings

- 1. **SeamlesSEAL Acrylic** is available as a base coat (BC), top coat (TC), quick set (QS), high tensile (HT), bleed blocker (BB), Fire Rated (FR) and clear coat (for skylights).
- 2. SeamlesSEAL Ultra Silicone coating is available in low solids (LS), high solids (HS) and high solids with low VOC (HSLV).

Note: Additional information can be found in the applicable product data sheets or by referencing Spec Supplement S-04-19 (Primers and Coatings).

2.06 Granules

Shall be number 11 screen size, ceramic-coated roofing granules, color to match topcoat. Quartz or silica aggregate are also acceptable. Apply at a rate of 30-40lbs per 100 square feet.

2.07 Related Products

A. Treated Woven Fiberglass Fabric 20 x 10

A uniformly distributed fiberglass membrane (2.0 oz/sq. yd) consisting of continuous fiberglass threads woven perpendicular to each other and coated with an oxidized asphalt binder. Used in lieu of cover boards to form a substrate over fluted steel decks for application of spray foam.

B. Edgings and Copings

When metal edging or coping is to be installed (particularly when shop fabricated), it is strongly advised that the design conforms with Factory Mutual recommendations, NRCA guidelines for metal edging used in foam roofs and with SMACNA (Sheet Metal and Air Conditioning National Association) specifications. To ensure such compliance, FM 1-90 approved metal edge systems should be specified. Design Reference Dr-02-19 "Metal Edging and Coping" shall be referenced for additional design information.

The securement of perimeter wood nailers, play an equally important role in the overall performance of metal fascia systems. Design Criteria for the attachment of wood nailers which have been identified in the FM 1-49 Loss Prevention Data Sheet are summarized in the Design Reference Dr-01-19 "Wood Nailers and Securement Criteria" and shall be referenced for the specific securement method.

2.08 Roof Walkways

Walkways are to be specified at all traffic concentration points (i.e., roof hatches, access doors, rooftop ladders, etc.), and if regular maintenance (once a month or more) is necessary to service rooftop equipment. PremiR+ 60 and PremiSEAL 60, 70 are the recommended SPF for walkways. To enhance slip resistance, granules may be added at 30-40 lbs per 100 sq. ft.

A. Where applicable, a weather-resistant, breathable, resilient pad composed of synthetic rubber strands or other suitable material shall be installed to create protected surface over the SPF and coating system. Walkway shall be of a different color to provide contrast against the coated surface. CRFC may be contacted for a list of walkways acceptable for use. B. As an option, a walkway system can be formed by an additional layer of spray coating and CRFC granules. A contrasting color to the coating shall be selected so that the walkway system can easily be identified. In installation details attached at the end of this section shall be referenced, F-25.

2.09 Other Related Products

Other products may occasionally be required to accommodate specific job site condition, such as FM approved fasteners and plates to secure tapered board stocks, low rise polyurethane adhesive to attach insulation fill or tapered crickets and saddles. 7/32" exterior grade plywood sheeting and coated threaded fasteners to secure plywood over wood plank decks where needed. Cured or pressure sensitive EPDM membrane/ flashing for use under metal copings and for ties to various sloped roofs (shingles, shakers, slate). Contact CRFC for list of approved products.

PART III EXECUTION

Prior to commencing with the installation of any of the PremiR+ or PremiSEAL SPF Roofing Systems, refer to Paragraph 1.05 "Warranty Table" for applicable requirements suitable for the appropriate warranty coverage.

Requirements listed in this specification are considered minimum and are intended for the sole purpose of obtaining a Carlisle Roof and Foam Coating (CRFC) Warranty. Additional requirements dictated by Regulatory Agencies, Building Insurance or Specifiers must be complied with and are beyond the scope of this specification.

3.01 General

- A. Safety Data Sheets (SDS) must always be on location during transportation, storage and application of materials. The applicator shall follow all safety regulations as recommended by OSHA, the Spray Polyurethane Foam Alliance (SPFA) and the Center for the Polyurethanes Industry (CPI) of the American Chemistry Council (ACC) and/or other agencies having jurisdiction.
- B. To ensure most current installation requirements are met and techniques are followed, Product Data Sheets should be available on site and consulted.
- C. Do not begin application of SPF insulation until substrate and environmental conditions are satisfactory. Owner shall ensure penetrations and other details are secure to prevent movement.
- D. Subject to project conditions, it is recommended to begin the application of this roofing system at the highest point of the project area and work to the lowest point. Completion of all flashings, terminations, coating, and daily seals shall be done in a manor to promote positive drainage.
- E. Plan installation so that daily seal is located in an elevated area to not restrict water flow or adversely impact roof drainage.
- F. A proper substrate shall be provided by the building owner. The structure shall be sufficient enough to withstand normal construction loads and live loads.
- G. Protect areas of high construction traffic using plywood sheets.

3.02 Roof Deck/Substrate Criteria

- A. Proper decking shall be provided by the building owner.
 - 1. The building owner or its designated representative must ensure that the building structure is investigated by a registered engineer to assure its ability to withstand the total weight of the specified roofing system as well as construction and live loads in accordance with all applicable codes.
 - 2. The specifier must also designate the maximum allowable weight and location for material loading and storage on the roof.
- B. Defects in the substrate must be reported and documented to the specifier, general contractor and building owner for assessment. The CRFC Authorized Applicator shall not proceed with installation unless defects are corrected.
- C. Steel roof deck, shall be a minimum of 22-gauge and be securely installed to conform to local building code requirements. Deflections shall not exceed 1/240 of the span.
- D. Acceptable Decks
 - 1. Structural Concrete decks that are rated 3000 psi or greater.
 - 2. Steel decks 22 gauge or heaver. Lighter gauge steel may be considered upon review and approval by CRFC.
 - 3. Plywood or OSB (min 15/32") or Wood Planks (min 3/4") are acceptable.
 - 4. Other decks, such as tectum or gypsum, contact CRFC for recommendations.
 - 5. Recover existing roof system as approved by CRFC.

3.03 Substrate Preparation

A. General

SPF roof systems can be successfully applied to most substrates. The SPFA-138 Guideline for Roof Assembly Evaluation for SPF Roof System shall be referenced for established procedures and practices successfully used in the spray foam industry, and the NRCA SPF roofing manual.

All surfaces to receive SPF insulation must be clean, dry, free of dust, dirt, debris, oil, solvents and all other materials that may adversely affect the adhesion of the SPF.

Existing Phenolic Foam insulation, if present, must be removed prior to the application of SPF system. The condition of the deck below must be assessed by the building owner representative so that proper measures are taken to ensure an adequate substrate is provided.

Projects with lightweight insulating concrete, must be submitted to CRFC for specific recommendations.

When applying the SPF directly over an existing roof, the wind uplift resistance of the new system will not exceed that of the existing one. Evaluate the existing roof as to its resistance to wind uplift and ensure methods are taken to meet code or other mandated wind uplift criteria.

Prior applying SPF over existing roof, building owner should temporarily remove lightning rods and disconnect cables. Conduits should be relocated or raised above the finished roof surface.

Note: When required by local codes or building owner, such work may be performed by a licensed electrical/mechanical contractor in accordance regional regulations.

Skylights, vents, drains, and other maintenance prone roof mounted units must be masked prior to SPF application.

For additional information refer to SPFA-143 "Primers: Why, When, and How to use them".

B. When specifying this roofing system over existing steel deck

- 1. Inspect the deck for damage or holes. Replace or repair as required with matching steel decking materials, ensuring new sections are well secured and stable.
- 2. Remove any loose scale, rust and weathered or chalking paint using a wire brush, scraper, sand blasting or other suitable means. Prime if necessary and as recommended.
- 3. Remove all dust, dirt and debris using air, a hand or power broom and/or a power washer. Other contaminants such as oil and grease must be removed with appropriate non-sudsing cleaning solution, or steam cleaner and rinsed with clean water.
- 4. Several options are available for the SPF application as described by the details included at the end of this section, refer to details at the end of this section.
 - a. When a thermal barrier is considered, use 1/2" Dens Deck or Securock with all joints tightly butted and all boards fastened with FM-approved threaded fasteners and plates at the rate of 12-16 fasteners and plates per 4'x8' board. Gaps greater than a 1/4" must be taped.
 - b. In lieu of fastening a thermal barrier, the foam may be applied to fiberglass fabric with adhesive backing applied directly to the fluted deck.
 - c. In lieu of fastening a thermal barrier, Polyiso flute fill, cut flush with the steel deck and firmly adhered to the steel deck with foam adhesive to avoid movement by wind.

NOTE: The SPF can be applied directly to the steel however, the final top surface of the SPF will mirror the flutes of the steel deck, resulting in an uneven appearance and may create surface undulation.

C. When specifying this roofing system over structural concrete deck rated 3,000 psi or greater

The structural deck must have cured for a minimum of 28 days at temperatures above 50°F (10°C) and must be free of any laitance. Situ Relative Humidity Testing (ASTM FF2170) shall be followed to assess

moisture level within the structural slab, refer to appropriate design reference located in the CRFC technical binder.

- 1. Using air pressure, a hand or power broom and/or a vacuum, remove all loose dirt, dust and debris. Oil, grease, release agents and other contaminants must be removed using the appropriate cleaning solution or abrasive methods.
- 2. All joints or cracks greater than 1/4 inch shall be caulked or grouted prior to SPF application. The caulk or grout must be allowed to completely cure prior to the application of the SPF.
- 3. Prime the clean, dry concrete surface with CRFC approved primer at the rate of 1/2 to 1 gallon per 100 square feet.

D. When specifying this roofing system over existing wood decks

- 1. The plywood shall contain no more than 18 percent moisture by weight.
- 2. All untreated and unpainted surfaces may be primed with CRFC approved primer at the rate of 1/2 to 1 gallon per 100 square feet, to minimize moisture absorption and aid in the SPF adhesion.
- 3. Installation of the SPF is not permitted directly over wood plank decks, due to potential movement of the planks. Securely fasten, 7/32" exterior grade plywood to the wood plank deck. The fastening density should be sufficient to provide desired wind resistance and prevent sheeting movement. Refer to detail F-C for additional detail.
- **Note:** A thermal barrier of 1/4" or 1/2" Dens Deck or Securock may be used in lieu of plywood sheeting and shall be fastened with 12-16 FM-approved fasteners and plates per 4'x8' sheet or per CRFC approval.
 - 4. For project over 15/32" APA rated exterior grade plywood, the SPF may be applied directly to the plywood substrate or over a thermal barrier, per CRFC recommendations.
 - a. When a thermal barrier is used follow the procedure as outlined in 3.02.D.1.
 - b. When the SPF is directly applied to the plywood, any joints greater than 1/4 inch shall be caulked or taped prior to the SPF application.
 - 5. Remove all loose dirt, dust and debris using air, a hand or power broom and/or a vacuum. Power washing is not recommended as it may introduce water into the substrate. Oil, grease and other contaminants must be removed using appropriate cleaning solution. Severely contaminated wood substrates shall be removed and replaced with acceptable cover board.

E. When specifying this roofing system over existing Asphaltic Built-Up/Modified Bitumen Roof Systems

1. Using a wet vacuum, power vacuum, power broom, or other suitable means remove all loose and poorly embedded aggregate surfacing material.

- 2. All wet insulation under existing built-up roof membrane must be removed and all voids must be filled with similar, compatible insulation. As an alternative, apply primer and SPF and level to grade.
- 3. Repair all defects, such as blisters, ridges, splits, and delamination's, by cutting, removing and fastening to form a solid substrate.
- 4. Remove or refasten all loose base flashing, counter-flashing, and gravel stops as required. Perimeter wood nailers must be inspected for deterioration and refastened as needed. All deteriorated nailers shall be removed. Refer to Design Reference DR-01-19 "Perimeter Wood Nailer (Wood Nailer and Securement Criteria)".
- 5. Apply Prime-Tek primer at the rate of 1/2 gallon per 100 sf, to the clean, dry BUR/Mod-Bit surface.

F. When specifying this roofing system over existing Metal Roofs

The metal Roof Systems must be at least 26 gauge or heavier. With all panels properly fastened to the structure and free rust and loose materials.

- 1. Replace any missing fasteners and tighten any loose screws.
- 2. Any rust scale and loose materials must be removed, by mechanical means, Including any soft mastics or loose sealants.
- 3. Pressure wash the metal roof surface and all flashings and allow to fully dry.
- 4. Where rust scale and loose material have been mechanically removed prime area prior to SPF application.

G. When specifying this roofing system over existing Fully Adhered Single Ply Membranes

The existing membrane assembly, must be properly secured to provide a sound base for the new SPF roofing assembly. If necessary, additional fasteners and insulation plates should be used to enhance the securement of the existing membrane assembly.

- 1. Using a pressure washer and tap water, remove all dirt, dust, oils and other contaminants from the existing membrane surface.
- 2. Remove loose flashing at penetrations. Intact flashing may remain provide the new termination extends above the existing without concealing/block any weep holes.
- 3. Wet insulation, if detected must be removed and the voids created by such removal, filled with compatible insulation and leveled to achieve a relatively even surface. Replacement insulation shall be fastened or secured with low rise adhesive.

- 4. Cut and remove bridged membranes and remove flashing at walls and around penetrations and roof edges.
- 5. Replace metal drip edges and secure with ES-1 compliant metal.

Note: Prior to priming the EPDM membranes, the membrane must be cleaned with Prime-Tek Membrane Cleaner. Prime the entire EPDM membrane with Prime-Tek Epoxy Primer.

H. When specifying this roofing system over existing Mechanically Fastened Single Ply Systems

- 1. The existing loose membrane shall be removed, and existing flashing must be cut and removed along the perimeter.
- 2. Through out the field of the roof, parallel to the row fasteners, cut membrane on each side of the fastening plate as show in the applicable CRFC detail.
- 3. Remove loose flashing at penetrations. Intact flashing may remain provide the new termination extends above the existing without concealing/block any weep holes.
- 4. Remove and replace wet and damaged insulation. Install additional fasteners and plates to ensure all existing and new boards are fastened at the minimum rate of 1 fastener per 4 s.f.
- 5. In leu of membrane removal, install a new coverboard consisting of either 1/4" or 1/2" DensDeck or Securock or use 1/2" SecurShield HD Polyiso.
- 6. Ensure all surfaces are clean, free of dust, and other contaminants prior to SPF application.

I. When specifying this roofing system over existing Ballasted Single Ply Systems

After the removal of the existing ballast and membrane, and depending the type of existing insulation, a coverboard may be required or the existing insulation may be used as a substrate for the new SPF assembly.

- Roofs with existing expanded or extruded polystyrene insulation will require the use of a new cover board consisting of either 1/4" or 1/2" DensDeck or Securock or use 1/2" SecurShield HD Polyiso.
- 2. Roofs with existing Polyisocyanurate roof insulation may be:
 - a. Fastened at the rate of 1 fastener per 4 s.f. after the removal of wet and damaged insulation. All boards must also be tightly butted to avoid gaps greater than 1/4".
 - b. Overlay with a new coverboard consisting of either 1/4" or 1/2" DensDeck or Securock or use 1/2" SecurShield HD Polyiso, after the removal of wet and damaged insulation. The new cover board shall be fastened at the rate of 1 fastener per 4 s.f.
- 3. CRFC may be contacted for other available options or specific verification.

J. Saddles, Crickets and Tapered edge strips

- 1. Installed saddles, crickets and tapered edge strips in locations designated to promote positive drainage.
 - a. For reroofing projects, roof drainage must be assessed and if necessary, additional saddles and crickets in deflected areas must be installed to eliminate ponding.
 - b. For new and existing projects, saddles, crickets and tapered, edge strips must be designed with slopes at least double that of the roof surface.
 - c. Saddles, Crickets, and tapered edge strips can be formed using tapered coated glass faced Polyiso insulation mechanically fastened or set in polyurethane adhesive (provided adhesive is compatible with substrate, do not use directly over PVC or TPO membranes).
 - d. When fastening the tapered boards, FM-approved fasteners and plates must be used at the rate of 1 fastener per 2 square feet When adhesive is used, the bead spacing shall not be greater than 4" o.c. or may be fully adhered using spray adhesive.

Note: As an option to the tapered boards, CRFC SPF may be used in multiple passes to achieve the desirable thickness and slope.

K. CRFC may be contacted for information on other substrates not listed here in.

3.04 Spray Foam Application

A. Preparatory Work and Safety

All surfaces must be clean and dry prior to application of an approved primer and SPF application.

- All objects that require protection from overspray shall be protected; all mobile objects shall be moved to an acceptable, protected area. All intake air vents shall be turned off and covered. Temporarily close off roof drains, remove roof-drain plugs when not applying coated SPF roofing or when rain is forecast.
- 2. Apply the SPF in strict accordance with CRFC's specifications and application instructions, using spray equipment recommended by CRFC.

During the SPF application, only workers wearing appropriate personal protective equipment (PPE) should be present.

B. General

1. SPF insulation is combustible. High intensity heat sources such as welding or cutting torches

must not be used near any polyurethane foam.

- 2. The thickness of the SPF **must not be less than that required** to issue the Carlisle warranty and must comply with the thermal value required for each project and is subject to code approval limitations.
- 3. In addition to verifying moisture level within the concrete in accordance with ASTM F 2170, at the start of the insulation or each day thereafter, verify the concrete substrate is visibly dry and free of moisture. Test concrete substrate for moisture by plastic sheet method according to ASTM D4263 at start of each roof area or plane. Do not proceed with work if moisture condenses under the plastic sheet.
- 4. Do not apply primer to surfaces, with surfaces below 50°F (10°C) or above 130°F (54°C) unless written approval has been secured from CRFC. Primers must not be applied during rain or if the threat of rain exists. They must not be applied when the dew point is less than 5°F (~3°C) above ambient temperature.

C. SPF Application

SPF thickness shall not be less than that required by CRFC to issue the applicable warranty. The SPF must extend on the parapet and other roof protrusions a minimum of 4" (or above the slush line, whichever is greater) above the finished roof surface. Protect the area immediately above the SPF from overspray so that proper termination can be provided with the coating.

Determine if primer is required on the roof substrate to enhance the adhesion. Masonry/Concrete walls and other roof protrusions shall be primed.

- 1. Equipment Settings
 - a. "A" and "B" Component Preheaters should be set at 125°-130°F (51°- 54°C); hose heat should be set to maintain these temperatures.
 - b. Set the dynamic fluid pressure at 1,000 to 1,200 psi. Mixing ration through the Proportioner is 1:1 by volume. 2:1 Transfer pumps are recommended to provide positive feed of the material to the Proportioner. These are recommended initial settings and may vary based on specific conditions.
 - c. When opening "B" component drums, open the bung slowly to help release any built-up pressures. This is due to presence of blowing agents which can expand if the drum is exposed to high temperatures.
- 2. Apply the SPF in multiple passes, as required, with a minimum pass thickness of 1/2". Apply the full thickness of SPF in any area on the same day.
- 3. Allow at least 10 minutes between each pass for cure and cooling.
- 4. Multiple layers can be applied to reach the desired thickness and insulation value, as well as to facilitate positive drainage.

D. Completed SPF Surface

- 1. The completed SPF surface shall be smooth to coarse orange peel texture; popcorn texture is not acceptable. Consult SPFA-145 publication for additional information and visual descriptions of texture levels.
- 2. The completed surface shall be free of pinholes and/or "glass windows" caused by improper equipment calibration or climatic conditions.
- 3. Retain batch numbers for the "A" and "B" components and areas where applied. Such information shall be recorded in the daily log.
- 4. The finished surface of the SPF must be protected from the adverse effects of sunlight, which can cause discoloration and degradation. The protective coating or covering should be applied over the SPF the same day as the application or within 24 hours.

3.05 Coating Application

A. Coating of New SPF

Apply coating when temperature is above 50°F (10°C) with no inclement weather imminent. The base coating shall be applied on the same day as the SPF application, after the SPF has been allowed to cure a minimum of one hour. Do not apply coatings when ambient or substrate temperatures are below 50°F (10°C).

- 1. Apply the base coat in a uniform application to achieve the required dry film thickness.
- The base coat shall not be subjected to foot traffic or otherwise disturbed until it is tack-free or cured. After it has cured, inspect the coating for pinholes, cracks, thin areas or other defects. All defects observed shall be caulked with appropriate CRFC sealant/mastic and/or roller coated with additional base coat prior to applying subsequent coats.
- 3. The base coat and sealant/mastic must be cured, clean and free of all moisture prior to application of intermediate coat and/or topcoat.
- 4. Apply the intermediate coat and/or topcoat in a contrasting color to the base coat within 72 hours of the base coat application. The subsequent applications shall be made at 90 degrees to the base coat application.
- 5. Surface texture and conditions may require additional quantities of coating to insure proper thickness. It is the applicator's responsibility to properly coat the SPF insulation regardless of the quantity of coating necessary.
- 6. Apply the topcoat in a uniform application to achieve a minimum total finished dry film thickness of the base coats and topcoat to equal that required in the warranty table paragraph 1.05.
- 7. Approved roofing granules may be installed in the topcoat to improve aesthetics, traffic

resistance, and impact resistance. Apply at a rate of 30-40lbs per 100 square feet.

- 8. The coating shall be applied a minimum of 2 inches beyond all the terminated edges of the SPF. Such locations should be masked to provide a straight edge, neat, finished appearance.
- 9. Allow the topcoat to cure and inspect the finished coating surface for pinholes, cracks, thin areas, or other defects. Repair any defects observed with appropriate CRFC sealant/mastic and/or additional acrylic coating material.
- 10. If overspray is a concern, use rollers to apply base and top coats. Back rolling is recommended if pinholes are observed in the SPF or previously applied coating layer. It is always recommended in recoat applications.
- 11. The use of brushes is recommended for delicate detail work and trimming at parapets, HVAC units, Stacks, skylights, etc.

B. Recoating of existing SPF Roofs

- 1. Information outlined in Attachment I "Recoating of existing SPF" are prepared solely for the purpose of maintenance of an existing coating system and not intended for correction to badly deteriorated roof system that may require replacement.
- 2. The guidelines contained the attachment are intended for sound SPF system that is well adhered and not contaminated with moisture or with existing leaks. The coating restoration shall be referenced for roofs not in compliance with the stated conditions.

3.06 Flashings and Terminations

For other requirements which must be complied with in order for Carlisle warranty to be issued, refer to Design Reference DR-01-19 "Metal Edging and Coping".

The SPF shall be neatly terminated a minimum of 4" (or above the slush line, whichever is greater) above the finished roof surface at roof penetrations. Sprayed-in-place cants shall be applied to allow a smooth transition from the horizontal to vertical surface.

- 1. Mask areas where coating is to be terminated to prevent surface contamination with SPF overspray.
- 2. At parapets, HVAC units, Stacks, skylights, etc., use a brush to apply coating for delicate detail work and trimming.
- 3. Extend coating a minimum of 2", in multiple layers, above the SPF to form an adequate termination.
- 4. Refer to CRFC SPF details at the end of this section for the appropriate flashing method used at the various roof details.

3.07 Roof Walkways

Roof walkways are to be specified at all traffic concentration points (i.e., roof hatches, access doors, rooftop ladders, etc.), and if regular maintenance (once a month or more) is necessary to service rooftop equipment. Refer to Spec Supplement S-06-19 "Roof Walkway Installation".

- A. Where applicable, a weather-resistant, breathable, resilient pad composed of synthetic rubber strands or other suitable material shall be installed to create protected surface over the SPF and coating system. Walkway shall be of a different color to provide contrast against the coated surface. CRFC may be contacted for a list of walkways acceptable for use.
- B. As an option, a walkway system can be formed by an additional layer of spray coating and granules. When heavy concentrated traffic is anticipated SPF with higher compressive strength, 70 or 80 psi, may be used in such locations. A contrasting color to the coating shall be selected so that the walkway system can easily be identified. Refer to installation details attached at the end of this section shall be referenced, F-25 or Spec Supplement S-06-19 "Roof Walkway Installation".

3.08 Daily Seal

SPF application shall be limited to that which can be completed to full SPF thickness in the same day. All exposed foam tie-in end laps and side laps must be primed at the end of each workday. Prime-Tek General Purpose Acrylic Primer. If the SPF is not applied over the primed area within 72 hrs the primer must be reapplied and allowed to fully dry before continuing work. Refer to Spec Supplement S-05-19 "Equipment Shut Down and Clean Up".

END OF SECTION

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This Spec Supplement represents the applicable information available at the time of its publication. Owners, Specifiers and Carlisle authorized roofing applicators should consult CRFC or their Manufacturer's Representative for any information that has subsequently been made available.



SPF Roof Attachment Recoating of SPF Roofs "Attachment I"

October 2019

Information contained in this attachment are prepared solely for the purpose of maintenance of an existing coating system and not intended for correction to badly deteriorated roof system that may require replacement.

These guidelines are intended for a sound SPF system that is well adhered and not contaminated with moisture. CRFC specification for coating restoration shall be referenced for roofs not in compliance with the conditions state here in.

General Recoating Considerations

Apply coating in strict accordance with published applicable regulations of the manufacturer and local, state, or federal agencies which have jurisdiction.

- A. Coordinate with designer/owner for desired colors for field & walkways and solar reflectivity, where required.
- B. When SPF and coating have been utilized to form the existing walkways, recoat surface to contrast the roof color for ease of identification.
- C. Working within the recommended temperatures and humidity levels, apply coating and work from the high points of the roof towards the low areas of the roof.
- D. Adhesion tests are required for aged coatings to ensure new coating is properly adhered (2.0 pli min). If necessary, utilize appropriate primer to enhance the adhesion of the new coating.
- E. Do not proceed with application of coating or sealing materials when temperature is below product specified minimum. No coating system shall be applied if weather will not permit it to dry prior to exposure to precipitation or freezing.
- F. Do not apply materials unless surface to receive roofing system is clean, dry and prepared as specified.
- G. Existing acrylic and silicone coated surfaces must be cleaned with Prime-Tek Membrane Cleaner and pressure washed prior to new coating application.

Coatings Options:

A. **SeamlesSEAL Acrylic Coating**, is a 100% acrylic, single component, water-based, premium quality elastomeric coating for spray, brush, or roller application. It is specifically developed for protection of a SPF roof systems. It is excellent for waterproofing and restoring existing roof systems as well as prepared masonry, metal, wood and asphaltic surfaces with the proper primer or basecoat.

The SeamlesSEAL Acrylic is available as a base coat (BC), top coat (TC), quick set (QS), high tensile (HT), bleed blocker (BB), Fire Rated (FR), clear coat (for skylights).

NOTE: SeamlesSEAL TC can be used as a top or base coating or in single coat applications. SeamlesSEAL BC can be used as a basecoat in two coat applications but is not recommended as the top or finish coating.

B. **SeamlesSEAL Ultra Silicone Coating,** is a single-component, moisture-cured, fluid-applied silicone coating. The coating comes in a variety of types (listed below). It is easy to apply and once cured, the silicone coating membrane offers resistance to water intrusion, UV exposure, and natural weathering.

The SeamlesSEAL Ultra Silicone coating is available in low solids (LS), high solids (HS) and high solids with low VOC (HSLV).

NOTE: Acrylic coatings are not compatible over silicone (coatings, sealants or mastics).

Examination

Inspect existing surfaces to ensure sure they are clean, smooth, sound, properly prepared, and free of moisture, dirt, debris, or other contamination.

- A. Verify that all roof penetrations, mechanical equipment, cants, and edge metal are in place and secure.
- B. Ensure all critical areas around the immediate vicinity of the spray area are adequately protected.
- C. Verify all roof drains are clean and in working order.
- D. Verify that all air conditioning and air intake vents are temporarily sealed or closed.

PREPARATION

All surfaces to be coated must be clean, sound, dry and free of any dirt, grease, oil, debris or other contaminants that may interfere with proper adhesion. Pay particular attention to the low areas on the roof, where more contaminants may have settled. Loose coating shall be removed prior to application of new coating. Any wet areas must be removed and/or dried out prior to application of coating.

- A. Small areas where SPF is found, Broom areas that are small to remove the degraded SPF prior to sealant and coating application.
- B. Fill voids and seal cracks holes or other surface imperfections with the applicable CRFC mastic.
- C. Caulk or fill all cracks, holes or other surface imperfections with a high quality elastomeric sealant or mastic designed for roofing applications.
- D. Allow sealant/mastic to thoroughly dry before application of coating.
- E. Foam removal for large area repairs

Large damaged and deteriorated areas must be repaired by the removal of the existing coating and wet SPF.

- i. Use mechanical scarifying equipment to remove damaged SPF to a minimum depth of 1/2"or until dry SPF is reached, whichever is greater. Removal of SPF by hand is not acceptable.
- ii. Large or deep areas of foam removal will require the application of additional foam prior to coating. Apply a minimum of ½" new SPF. Do not remove an area more than what can be re-foamed and cover by the base coated in the same day.
- iii. Areas where the foam has been replaced should receive and additional application of CRFC coating beyond the specified coating thickness.

APPLICATION

Valleys, low areas, and those areas of the existing coated surface where heavy soiling/discoloration has been observed should be targeted for additional layer of coating to safeguard against slow drainage.

- A. After thorough preparation of the existing surface, the entire roof shall receive minimum two coats of CRFC coating to the desirable DFT.
- B. The base coat should be evenly applied at the rate of 1½ gallons per 100 square feet by spray or using a roller. If spraying, backroll the first coat. Apply enough pressure on the roller to work the coating into all the rough areas of foam.
- C. Allow the first coat to dry thoroughly, approximately 4 to 12 hours, prior to the application of the second coat.
- D. The second coat should be evenly applied at the rate of 1½ gallons per 100 square feet by spray or using a roller.
- E. Heavy puddles of coating should not be left on the roof. All coatings should be distributed evenly at the specified rates of coverage.

CLEAN-UP: Refer to Spec Supplement S-05 "Equipment Shutdown and Clean UP".

End of Section

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SPF Installation Guide on Metal Roofs Attachment II Metal Retrofit

October 2019

Information included in this attachment lists specific requirements needed when retrofitting existing metal roofs with Carlisle Roof Foam and Coatings (CRFC) Spray Polyurethane Foam (SPF) coating. In order to receive the CRFC System Warranty.

In addition to the requirements stated hear in, the main specification shall be referenced. For all other applicable prerequisites.

Description

This retrofit system consists of CRFC PremiR+[™] and PremiSEAL[™] SPF, minimum 1" thick or greater depending on the warranty duration (Contact CRFC for additional information). PremiR+ is available in compressive strength from 40 to 60 psi. PremiSEAL SPF is available in compressive strength from 40 to 80 psi. The SPF is covered with either SeamlesSEAL[™] Ultra Silicone coating or SeamlesSEAL Acrylic coating. Both coatings are available in variations, as out lined in Spec Supplement S-04-19. The system is terminated along the rake edges, eves, and the ridges edges as outlined in the details at the end of this attachment.

Warranty

This SPF metal retrofit system is eligible for 10, 15 or 20 year system warranty, depending on the SPF thickness and coating type and its dry mils thickness.

System warranty available only for installation where the SPF is applied over the entire roof covering all standing seams.

Substrate Preparation

- A. Metal surfaces to be coated shall be clean, dry, sound, and free of dirt, grease, oil and any other contaminants that might interfere with the adhesion of the elastomeric coating.
- B. All mechanical fasteners shall be checked for integrity. Retighten or replace as necessary. "Stripped out" fasteners shall be replaced using a larger diameter fastener.
- C. Medium or heavily rusted areas shall be wire brushed, sandblasted or mechanically abraded to remove all loose rust. Metal panels deteriorated to the point that their structural integrity is compromised shall be replaced.

- D. All rusted areas shall be primed with Prime-Tek Bleed Block Primer.
 - i. Prior to application of Primer, abrade the existing material to a feathered edge where the surface may have been previously treated.
 - ii. For lightly rusted areas or areas where rust was mechanically removed apply Primer using airless spray equipment at a rate of 200 square feet per gallon.
- E. Remove excessive amounts of asphaltic-based or other deteriorated patching or flashing materials if present.
- F. Check all seams to ensure that they are tight and flush. Excessive gaps or deflection between panels shall be eliminated by installing additional fasteners or rivets as necessary to limit deflection to 1/4" (6mm) or less.
- G. All metal surfaces, shall be cleaned with minimum 2,000 psi water to remove any existing loose paint or coating. Heavy deposits of dirt or contamination may require agitation with a stiff bristle broom. Allow the roof to dry thoroughly.
- H. If the existing roof has been coated with Aluminized asphalt, contact CRFC for an appropriate primer.
- Fill gaps between 1/4" and 1/2" (6-13mm) at panel seams, joints and protrusions with an CRFC approved sealant or tape. Fill gaps larger than 1/2" (13mm) at the ridge cap, roof edge and/or interface of dissimilar materials with a polyethylene backer rod.
- J. Mask areas around perimeters and at roof penetrations where the new SPF system is to be terminated, to prevent surface contamination with overspray.
- K. Rerefer to Main Specification for other substrate preparations.

SPF Application

SPF thickness shall not be less than that required by CRFC to issue the applicable warranty but must extend above standing seams a minimum of 1". Applications where the SPF thickness might be greater than 1" but not extending above and concealing the seams are not eligible for CRFC system warranty. Contact CRFC for additional guidance.

- A. Comply with all safety requirements and installation instructions outlined in the installation section of the Main Specification.
- B. Insure the substrate is adequately prepared and free of dirt, debris, grease, oil, rust and other foreign materials.
- C. When favorable weather conditions are present, apply the SPF to the dry substrate in multiple passes to achieve the specified thickness. Make sure the surface is smooth to course orange peel texture. Rougher textures are not acceptable.
- D. The completed surface shall be free of pinholes and/or "glass windows" caused by improper equipment
calibration or climatic conditions. The roof shall not have any soft or spongy areas or areas with hard or brittle strings of improperly proportioned material.

Note: Retain batch numbers for the "A" and "B" components, areas where applied and climate conditions. Such information shall be recorded in the applicator daily log.

E. The finished surface of the SPF must be protected from the adverse effects of sunlight, which can cause discoloration and degradation. The protective coating or covering should be applied over the SPF the same day as the application or within 24 hours.

Coating Application

Apply coating when temperature is above 50°F (10°C) with no inclement weather imminent. Before the coating is applied the SPF has been allowed to cure a minimum of one hour. The coating shall be applied within the same day or 24 hours of SPF application. Follow CRFC's PDSs for minimum application temperatures.

- A. Apply the base coat in a uniform application to achieve a finished dry film thickness of approximately 1/3 to 1/2 of the total thickness required.
- B. The base coat shall not be subjected to foot traffic or otherwise disturbed until it is tack-free or cured. After it has cured, inspect the coating for pinholes, cracks, thin areas or other defects. All defects observed shall be caulked with appropriate CRFC sealant/mastic and/or roller coated with additional base coat prior to applying subsequent coats.
- C. The base coat and sealant/mastic must be cured, clean and free of all moisture prior to application of intermediate coat and/or topcoat.
- D. Apply the intermediate coat and/or topcoat within 72 hours of the base coat application. The subsequent applications shall be made at 90 degrees to the base coat application.
- E. Surface texture and conditions may require additional quantities of coating to insure proper thickness. It is the applicator's responsibility to properly coat the SPF insulation regardless of the quantity of coating necessary.
- F. Apply the topcoat in a uniform application to achieve a minimum total finished dry film thickness of the base coats and topcoat to equal that required in the warranty table paragraph 1.05.
- G. When specified, approved roofing granules may be installed in the topcoat to improve aesthetics, traffic resistance, and impact resistance. Apply at a rate of 30-40lbs per 100 square feet.
- H. The coating must extend onto the primed areas around the perimeters and a minimum of 2 inches beyond all the terminated edges of the SPF and at other roof penetrations.

Note: Refer to table to S-04 "Primers and Coatings" for applicable primer to be used prior to coating the surface adjacent to SPF.

I. Allow the topcoat to cure and inspect the finished coating surface for pinholes, cracks, thin areas,

or other defects. Repair any defects observed with appropriate CRFC sealant/mastic and/or additional acrylic coating material.

- J. If overspray is a concern, use rollers to apply base and top coats. Back rolling is recommended if pinholes are observed in the foam or previously applied coating layer. It is always recommended in recoat applications.
- K. The use of brushes is recommended for delicate detail work and trimming at parapets, HVAC units, Stacks, skylights, etc.

End of Section

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DIMENSIONS

	A.S.S.*	S.S.S.**
(\mathbb{A})	AS REQUIRED BY DESIGNER	START FOAM ABOVE GUTTER CLIPS TO CONVENE FUTURE MAINTENANCE
B	AS REQUIRED BY DESIGNER. THICKNESS OF FOAM MAY ALSO BE BELOW THE HEIGHT OF STANDING SEAMS BUT NOT LESS THAN 1	
C	3" (76mm) ±	SEE DETAILS <u>MR-1.8</u>

A.S.S.* ARCHITECTURAL STANDING SEAM S.S.S.** STRUCTURAL STANDING SEAM



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EXISTING HIGH-END VENTED ROOF EDGE



NOTES:

- 1. CUT HOLES IN EXISTING HIGH EAVE TRIM AT TOP TO REDIRECT VENTING. DESIGNER TO CALCULATE THE SIZES, FREQUENCY OF HOLES WITHOUT WEAKENING THE SHEET METAL.
- 2. SHEET METAL SCREWS @ 6" O.C., MAX.



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NOTE:

 LOW RISE FOAM MAY BE INJECTING IN CAVITIES, WITHOUT CAUSING DAMAGE TO RAKE METAL.



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Polyurethane Spray Foam Roof Attachment

Care & Maintenance & Repairs

"Attachment III"

October 2019

A. Preventative Maintenance

1. General Care and Maintenance

Listed below are general care and maintenance items that are requirements for Carlisle Roof Foam and Coatings (CRFC) systems. When followed they will maximize the roof system performance and extend the roofs life.

- a. **Maintain positive roof drainage,** keep the roof surface clean of leaves, twigs and accumulated dirt or debris especially at drains and scuppers. Ponding of water on the surface of the system may increase probability of soiling, discoloration, and adversely affect coat adhesion.
- b. Prevent premature degradation of the roof system. Do not expose the roof to:
 - i. Liquids containing petroleum products
 - ii. Solvents
 - iii. Grease used for lubricating roof top units
 - iv. Oils (new or old) used for air conditioning or compressor units
 - v. Kitchen wastes or other animal fats
 - vi. Chemicals

Prolonged exposure to these materials may cause swelling and possible degradation of the system if spills are not removed. Properly drained catch pans or other means of protection may be used for system protection.

c. Limit foot traffic. Direct food traffic to designated walkways Unprotected areas of the roofing system are more susceptible to damage from reoccurring foot traffic. Care must be used to limit foot traffic to designated walkway/protected areas.

2. Periodic Inspections

Periodic inspection program should establish by the building owner and conducted qualified and properly trained personnel. Inspection program should take effect when the roof is completed and continuing at least twice a year thereafter.

The inspection should concentrate on "high risk" areas such as roof hatches, transitions, drains and around all rooftop equipment, as well as a general inspection of the entire roofing system.

Periodic inspections should also include the examination of the roof deck from the underside for evidence of leaks, deteriorated decking, structural cracks, or movement and other deficiencies. Parapets and edging should also be examined for evidence of cracking, deterioration and moisture infiltration.

In addition to scheduled semi-annual inspections, roof inspections should be conducted after:

- a. Exposure of the roof to severe weather conditions, such as strong winds, hail or continuous heavy rainfall.
- b. Repair or replacement of rooftop equipment, and at any other time when the roof may become exposed to activities of other trades where damages may occur.
- 3. Roof Cleaning

Some roofs may require cleaning for aesthetic concerns or if the roof is in a very dirty environment. Extreme care should be exercised to prevent damage to the roof. Most often power washing with clean water will remove most accumulated dirt, a soft broom may be used to assist in the cleaning. Use a large volume of water and as low a pressure setting as possible to gently perform the cleaning.

Removal of other contaminants may require the use of a safe and biodegradable cleaning agent. Algae growth may require the use of an approved solution, such as a mild chlorine solution, diluted with water. A complete rinse clean water is required after the use of any chemicals or cleaning agent.

4. SPF Roofing – Maintenance

Roof system damage may occur due to abrasions, puncture by impact of forging missiles, hail or unusual roof traffic. Minor damage may be repaired with an approved sealant, mastic and/or spot coating of the affected areas with a compatible coating. All moderate to severe damage should be evaluate and repaired by an approved contractor. For warranted systems, contact CRFC for additional information. Owners should consider a maintenance agreement with the installer to prolong and properly maintain the system. Refer to SPFA AY-139 for additional information.

- a. Clean area to be repaired and remove exposed foam.
- b. Fill repair area with approved sealant and tool to convex surface extending a minimum of 1 inch beyond damaged area.
- c. Do not use clear or translucent caulks.

NOTE: For silicone coatings only use silicone sealants and coatings.

B. Safety and Caution

The roofing surface may be slippery when wet. Exercise caution when walking on the roof, particularly while walking on the light-colored surfaces, since ice or frost build up may not be visible. Always exercise care while on a roof and follow a roof safety and fall protection program.

- 1. Exercise care with tools and equipment to avoid damage.
- 2. When servicing rooftop units, care should be exercised when placing metal doors, lids, pans, or sharp objects on the roof surface.
- 3. When moving or replacing units or equipment on roofs, avoid overloading and damaging the roof system by protecting the surface of the work area with smooth sheets of plywood. The plywood must be weight to prevent displacement by wind and immediately removed after use.
- 4. During snow removal avoid damaging the surface by using plastic shovels and exercise care when working around curbs, walls or other penetrations to avoid damaging to areas. Snow blowers and shovels with sharp edges must not be used.
- 5. Clear the roof surface from all debris (such as, glass, bolts, nails, screws, metal shavings, etc.) and any other materials that may promote punctures or cuts to the system.
- 6. Remove all spills and foreign materials which may degrade the roof (such as solvents-based materials, oil based paint, etc.)

C. Repairs

1. Leak Investigation

- a. Begin leak investigations by conducting a thorough, visual inspection of the general location on the roof where leaks have been detected inside the building.
- b. Check areas around mechanical rooftop equipment, drains, edge metal, curbs, expansion joints, pipes, etc. to identify cuts, punctures, or other forms of damage.
- c. Explore the condition of metal flashing (i.e., edging, coping, expansion joint covers, etc.) for improperly sealed joints.
- d. Important Considerations
 - i. On metal decks, it is important to identify the direction of the deck flutes and deck slope. Moisture may infiltrate around the roofing system and migrate in the lower flutes of the deck and leak inside the building in low areas.
 - ii. On concrete decks, or on projects where the existing roofing material is left in place, some leaks

may be the result of moisture entrapment at the time of the original installation.

iii. On poorly insulated roofing assemblies, some leaks may be the result of condensation; therefore, it is important to determine the leak location and frequency.

2. Emergency Repairs

Only qualified applicators should perform repairs. The building owner may perform emergency repairs required to provide immediate protection from water infiltration; however, a CRFC Roofing Applicator must complete permanent repairs when weather conditions permit.

Use compatible sealants and coatings for temporary repairs to the roof. CRFC must be notified of this action in writing.

- a. Temporary Wet Surface Emergency Repairs
 - i. Clean the system of any film, which may have accumulated on the surface of the system.
 - ii. Clean the system surface around the damaged areas with a commercial cleaner.
 - iii. Rinse the area with clean water. Remove as much water as possible and dry as much as possible.
 - iv. Apply CRFC SeamlesSEAL Ultra silicone sealant to the damaged area.
- b. Dry Surface Emergency Repairs
 - i. Clean the system surface around the damaged areas with a commercial cleaner.
 - ii. Rinse the area with clean water and allow to dry.
 - iii. Apply CRFC SeamlesSEAL Ultra silicone sealant to the damaged area.
- c. Permanent repairs must be completed by a CRFC Authorized roofing applicator. CRFC must be contacted by building owner or through the CRFC Authorized Roofing Applicator to coordinate permanent repairs.

3. Coordination of Permanent Repairs

Permanent repairs for warranted roofs must be coordinated through CRFC. CRFC may be contacted directly by the building owner or through the Authorized Roofing Applicator, to initiate the repair process. Information on the CRFC warranty form must be made available when reporting leaks or requesting a service covered under the terms of the warranty. Quotes to perform the warranty repairs will be solicited by CRFC from Authorized Roofing Applications, specifically the original applicator who performed the work. A work schedule will be negotiated so that repairs are finalized in a timely manner.

4. Roof Alteration

- a. To Assure the continuation of the warranty, any modifications or alterations to the roofing system (addition of units, pipes, satellite dishes, etc.) must be communicated to CRFC prior to proceeding.
- b. The proposed modification or alteration details will be reviewed by CRFC to determine compliance with CRFC Roofing System specifications.
- c. Coordinate the installation with the CRFC Authorized Roofing Applicator so the alteration is in compliance with CRFC approved details.

End of Section

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Polyurethane Spray Foam Roof Attachment

Aggregate Covered SPF

"Attachment IV"

May 2020

This **attachment** outlines the installation of a **Carlisle Roof Foam and Coatings Sprayed Polyurethane Foam/Aggregate Covered Roofing System**. Information pertaining to Substrate preparation and the installation of the Spray Foam and associated quality assurance and field quality control, can be reference in the main specification section. specifiers and contractors must reference the CRFC specifications and specification supplements contained in the CRFC Technical Manual and CRFC Product Data Sheets.

PART I GENERAL

1.01 DESCRIPTION

The Carlisle Roof Foam and Coatings SPF / Aggregate Covered roofing system is a spray-in-place closed-cell polyurethane foam (SPF) that incorporates PremiSEAL 70 (HFC-blowing agent) two-component foam applied to achieve the desirable thickness/R-value. In the flat areas, the Foam is covered with Stone aggregate at the rate of 500 to 600 Pounds per one square. Vertical surfaces and sloped areas exceeding ½" in 12" shall be protected with two coats of SeamlesSeal Acrylic Roof Coating. The coating is applied in two coats of contrasting colors to achieve a minimum thickness of 30 dry mils. The coating is extended approximately 18" onto the flat roof surfaces and the aggregate is embedded in the topcoat of the elastomeric coating.

1.02 QUALITY ASSURANCE

- A. Contractor Qualifications: Must be a current Carlisle Roof Foam and Coatings Authorized Applicator or current applicator of the approved roof system manufacturer.
- B. Roofing contractor must exhibit 5 years and a minimum of 50,000 sq. ft. experience installing the selected roofing system, with projects of a similar scope and nature.
- C. A Pre-Bid Conference shall be conducted one week prior to bid to discuss any details of the project not adequately covered within the specification and to review the normal flow of activities at the site.

Note: Access to the roof area will not be provided without a consent of the building owner's representative. All bidding contractors must attend this Pre-Bid Conference.

D. The completed roofing work will be inspected by an authorized representative of CRFC or an independent inspection firm designated by Carlisle Roof Foam and Coatings

1.03 SUBMITTALS

- A. Any alternate products shall be submitted to the owner and/or owner's representative 10 days before bid date to allow time for product review. Submittals shall include: all appropriate technical data sheets, manufacturer's warranty, and material safety data sheets.
- B. Contractor shall submit to owner's representative at or before time of bid:
 - 1. Reference projects with contacts, substantiating years of experience and completion of minimum prior work submitted.
 - 2. Provide specimen copy of Carlisle Roof Foam and Coatings 10-year warranty.

1.04 WARRANTY

The Carlisle roofing system warranty is available for commercial projects located in the USA and Canada when all the components used in the installation of the roofing system (excluding the aggregate or other accessory products specifically noted) are manufactured or marketed by Carlisle.

- A. The Carlisle Roof Foam and Coatings **10-year Warranty** shall be issued upon completion, inspection and acceptance of the project. The warranty covers repair of leaks caused by deterioration of the installed System, improper workmanship in the roof installation, and defects in the coating. This is a comprehensive warranty with no cap for repairs and is not prorated.
- B. The issuance of the warranty is dependent upon the proper application procedures as outlined by CRFC and when standard industry practices are followed.
- C. Prior review of the project specification by a CRFC representative is strongly suggested along with a thorough review of the bidders' qualifications (by the Owner's representative) as outlined in article 1.03 of this attachment.

PART II PRODUCTS

2.01 GENERAL

Components of this Sprayed Polyurethane Foam/Aggregate covered Roofing System are products of CRFC or accepted by CRFC as compatible. The installation, performance or integrity of products by others, when selected by the specifier and accepted as compatible by Carlisle, is not the responsibility of Carlisle and is expressly disclaimed by the Carlisle Warranty.

2.02 POLYURETHANE FOAM INSULATION

- A. The polyurethane foam used shall be Carlisle Roof Foam and Coatings **Premiseal 70**, a two-component, one to one by volume, SPF. The PremiSEAL liquid "A" component (ISO) and "B" component (Resin) are mixed through specialized proportioning spray equipment to produce a fast curing rigid foam plastic insulation. PremiSEAL provides an R-value of 6.3 per inch and a continuous insulation without thermal breaks.
- B. PremiSEAL utilizes an EPA approved, zero ozone depleting blowing agent. The proper reactivity must be used for the appropriate temperature conditions.

C. Physical property requirements are as follows:

Physical Property	Test Method ASTM	PremiSEAL 70
Compressive strength, psi	D 1621	55-65
Closed-cell content, percent	D 6226	94
Tensile Strength, psi, min	D 1623	65-80
K-factor, aged, max	C 518	0.158
R-Value per inch	C 518	6.3
Core Density lb/c.f.	D 1622	2.9-3.0
Dimensional Stability, 28 days, Percent volume change, max.	D 2126	<4
Water Absorption %	C 2842	0.6
Water Vapor Permeability perms @ 1in	E96 (A)	1.4
Flame spread, max.	E 84	40

Note: Consult product data sheet pertaining to use of these products and latest property data.

2.03 PROTECTIVE COATINGS

- A. SeamlesSEAL Acrylic Coating is a 100% acrylic, single-component, water-based, premium quality elastomeric coating for spray, brush, or roller application.
- B. Carlisle Roof Foam and Coatings **SeamlesSeal** Acrylic coating, shall consist of a minimum two coats of an elastomeric liquid applied material, domestically engineered and produced. The two coats shall be of contrasting colors and applied to achieve a minimum thickness of 30 dry mils per the two-coats combined.
- C. The SeamlesSeal Acrylic coating shall have the following physical properties

Physical Property	Test Method	SeamlesSEAL Acrylic Coating
Tensile Strength, psi (Max @ 73°F)	ASTM D 2370	273
% Elongation @ Break (73°F)	ASTM D 2370	262
Volume Solids, %	ASTM D 2697	55 ±2
Weight Solids, %	ASTM D 1644	68±2
Volatile Organic Content (VOC), (g/l)	EPA Method 24	<50
Permeance, perms	ASTM D 1653B	17
Temp. Limits for Normal Service		0° to 185°F

Note: Consult product data sheet for other specific product information and application instructions.

2.04 Aggregate

A. Aggregate (gravel or slag) shall meet ASTM D 1863 Size No. 7 (12.5 mm to 4.75 mm [1/2 in. to sieve size 4]) or Size No. 67 (19.0 mm to 4.75 mm [3/4 in. to sieve size 4]).

B. The gravel or slag shall be applied over all flat portions of the roof at a rate of 500 to 600 lbs. per square to achieve a minimum of **% inch** thickness over the Spray Foam.

PART III EXECUTION

3.01 GENERAL

When climatic conditions permitting, the spray polyurethane foam can be installed on new construction projects, when the deck, parapet walls, rough openings, and curbs are completed. Plumbing vents, drains, and electrical penetrations should all be in place. No other tradespersons should be present on the roof when the spray polyurethane foam and coverings are being installed.

- A. Verify that all surfaces to receive polyurethane foam insulation are clean, dry and free of dust, dirt, debris, oil, solvents and all materials that may adversely affect the adhesion of the polyurethane foam.
- B. Verify that all roof penetrations and flashings are properly installed and secured.

3.02 ROOF DECK CRITERIA

- A. A 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 plaza deck must be reported and documented to the specifier, general contractor and building owner for assessment The CRFC Authorized Applicator shall not proceed unless the defects are corrected.

3.03 POLYURETHANE FOAM APPLICATION

- A. All objects that require protection from overspray shall be protected and all air intake vents shall be turned off and temporarily sealed.
- B. Apply the polyurethane foam in strict accordance with CRFC's specifications and application instructions, using spray equipment recommended by CRFC.
- C. Polyurethane foam shall be applied in a minimum of ½-inch thick passes. The total thickness of the polyurethane foam shall be a minimum of 1½ inches, except where tapering is required to facilitate drainage.
- D. Apply the full thickness of polyurethane foam in any area on the same day.
- E. The polyurethane foam shall be terminated neatly a minimum of 4 inches above the finished roof surface at roof penetrations. Foamed-in-place cants shall be applied to allow a smooth transition from the horizontal to vertical surface.
- F. The finished polyurethane foam surface texture shall be "smooth to orange-peel", free of voids, pinholes and depressions. "Verge of popcorn" texture is acceptable if it can be thoroughly and completely coated at details and edges.

Caution: Popcorn and tree bark textures are not acceptable. Unacceptable polyurethane foam textures shall be removed, and new foam replied.

G. Protective Roof Covering Application

Sidewalls, parapets, exposed edges, curbs and sloped surfaces exceeding $\frac{1}{2}$ " in 12" or other roof penetrations shall be coated with two coats of **SeamlesSeal Acrylic coating** to achieve a minimum dry thickness of 30 mils. The coating should extend a minimum of 18" onto the flat roof/ Foam surface.

Caution: The polyurethane foam shall be dry and free of dust, dirt and other contaminants before application of the base coat.

- 1. when possible, apply the **base coat** the same day as the polyurethane foam. If more than 24 hours elapses prior to the application of the base coat, the polyurethane foam surface shall be inspected for UV degradation and a primer may be required. CRFC's Technical Department may be contacted for recommendations.
- 2. Apply the topcoat in a timely manner to ensure proper adhesion between the two coats. The topcoat shall be applied within 72 hours of the base coat application.

Note: The cured, dry-film thickness of the finished coating shall be checked by taking slit samples for testing under magnification. Areas that are found to have less than the thickness specified, will require additional application of coating.

H. Aggregate Application

1. The gravel or slag shall be applied, over all flat portions of the roof, at a rate of 500 to 600 lbs. per square to achieve a minimum of **% inch** thickness over the foam.

Caution: Aggregate stored on the roof, must be kept in small piles near the roof's perimeter to minimize stresses to the roof deck.

- 2. Once most of the aggregate, has been applied, it should be raked to ensure uniform distribution and additional aggregate added to areas with coverage less than ³/₄ inch.
- 3. Visually inspect the entire flat roof surface to verify the polyurethane foam is completely covered. Additional aggregate shall be applied where foam is visible or where the coverage is inadequate (less than ³/₄").

3.07 FIELD QUALITY CONTROL

- A. **Core samples,** of the roof system, shall be secured at project completion at the rate of one core per 10,000 square feet (minimum of 2 cores per roof) by an independent inspection firm to test for foam thickness, compressive strength, density and adhesion.
- B. **Slit samples** shall be taken, to test the coating thickness and coating adhesion. Three slit samples are required for every 10,000 square feet of roof area (minimum of 6 samples collected per roof). Areas where samples were taken, must be repaired with appropriate sealant and replacement of foam cores.
- C. During application, the contractor must exercise periodic quality control to ensure adequate adhesion and thickness of the foam and coating:
 - 1. Using a probe, the insulation thickness shall be verified at frequent and random locations.
 - 2. The polyurethane foam shall be examined for adhesion and thickness by removing cores at a rate of 1 every 10,000 feet.
 - 3. After the coating application has cured, the contractor shall remove slits to examine adhesion of the coating to the foam and verify the dry millage of the applied coating.

End of Section

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This Specification represents the applicable information available at the time of its publication. Owners, Specifiers and Carlisle authorized roofing applicators should consult CRFC or their Manufacturer's Representative for any information that has subsequently been made available.

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NOTE:

THE AGGREGATE COVERED SPF CONCEPT CAN BE EXTENDED TO ALL CRFC SPF DETAILS BY COVERING THE FOAM WITH AGGREGATE IN AREAS WITH SLOPES NOT EXCEEDING 1/2" PER FOOT* AND APPLYING 2 COATS OF SeamlesSEAL IN THE LOCATIONS IDENTIFIED IN THE GUIDE SPECS.

SLOPE: (1 METER : 42mm), (2.4), (4%)

TYPICAL CRFC ASSEMBLY WITH STONE AGGREGATE





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AGGREGATE COVERED SPF



NOTE:

1. ENSURE, WHERE EXPANSION JOINTS OR SIMILAR CAVITIES EXIST, THERE JOINTS ARE WATERPROOFED (BY OTHERS) TO AVOID WATER INTRUSION BEHIND ROOF ASSEMBLY.







NOTE:

1. DETAIL IS APPLICABLE TO OTHER SIMILAR PENETRATIONS, E.G. HVAC SUPPORTS, METAL TUBES OR I-BEAMS, ETC.





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Carlisle Foam and Roof Coatings Spray Polyurethane Foam (SPF)

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Glossary, Terms & Definitions

October 2019

The information contained in this supplement serves as a criteria for Specifiers and Authorized Applicators regarding the design and installation of Carlisle Roof Foam and Coatings (CRFC) roofing systems and related products. Additional information essential for the design and installation of the Roof Systems are also included in the respective Specification for each Roof System and in the Design Reference Section of as well as the applicable Spec Supplement.

Names/Acronym	Explanation
ABAA	Air Barrier Association of America
Absolute Humidity	The actual concentration of water vapor in air. May be expressed in units of kPa, grains of moisture per pound of dry air, pounds of moisture per pound of dry air, or as a partial pressure as inches of mercury (in. Hg).
AC-377 / Acceptance Criteria 377	The standard to which a specific formulation of SPF is evaluated by ICC-ES (International Code Council Evaluation Service) in order to issue an Evaluation Report which describes the foam's compliance with building code requirements.
Accelerator	A chemical additive to coating or polyurethane foam systems used in relatively small amounts to increase the speed of the reaction or decrease the time required to cure or dry.
Acid number	The number of milligrams of potassium hydroxide (KOH) required to neutralize the free acids in 1 g of an oil, resin, varnish, or other substance; generally reported on the nonvolatile content.
Acrylic Coating	A coating system based on an acrylic resin. Generally, a "water based" coating system that cures by coalescence and air-drying.
Acrylics	Resins resulting from the polymerization of derivatives of acrylic acids, including esters of acrylic acid, methacrylic acid, acrylonitrile, and their copolymers. They can be carried in a water or solvent solution and they are film-forming materials.
additive	a substance added in small quantities to another substance, usually to improve specific properties (for example, a drier, mildewcide, etc.).



Aerosol	A suspension of fine solid particles or liquid droplets in a gas. In high-pressure foam and coating applications, liquid SPF chemicals and coating materials are formed into an aerosol in the spray gun by expulsion through a nozzle. (See ATOMIZATION).
Aggregate	Any mineral surfacing material. May include crushed gravel, river washed gravel, roofing granules, etc.
Air Exfiltration	Air passing from the conditioned interior of a building to the exterior.
Air Impermeable	An insulation having an air permanence at a specific thickness that is equal to or less than 0.02 L/s•m2 at 75 Pa pressure differential (0.004 ft3/ft2•min at 1.57 lb/ft2) tested in accordance with ASTM E 2178 or E 283.
Air Infiltration	Exterior air passing into the conditioned area of a building.
Air Leakage	The uncontrolled flow of conditioned air through gaps, cracks or holes in the building envelope or its components.
Air Permeable	An insulation having an air permanence at a specific thickness that is greater than 0.02 L/s•m2 at 75 Pa pressure differential (0.004 ft3/ft2•min at 1.57 lb/ft2) tested in accordance with ASTM E 2178 or E 283.
Aliphatic (Polyurethane)	A type of polyurethane that does not contain carbon atoms arranged in aromatic (benzene) ring structures. As compared to AROMATIC (POLYURETHANE) coatings based on aliphatic polyurethane have superior resistance to UV weathering, and better color and gloss retention.
Alligatoring	Pattern cracking of a coating or mastic. So, called because of its resemblance to the pattern of an alligator skin.
Amine Catalyst	A broad range of nitrogen-based compounds that are used to promote blowing and curing reactions in polyurethanes. Amine catalyst is typically contained in the B-side, or resin, of the two-component polyurethane system.
APR	Air Purifying Respirator
Area Divider	A raised, flashed assembly (typically a single or double wood member attached to a wood base plate) that is anchored to the roof deck. It is used to relieve thermal stresses in a roof system where an expansion joint is not required, or to separate large roof areas (sometimes between expansion joints) and may be used to facilitate installation of tapered insulation.
Aromatic (Polyurethane)	A type of polyurethane that contains some carbon atoms arranged in aromatic (benzene) ring structures. As compared to ALIPHATIC (POLYURETHANE).



- Aromatic Solvents Hydrocarbon solvents comprised of organic compounds, which contain an unsaturated ring of carbon atoms, including benzene, xylene, toluene and their derivatives.
- Atomization The breakup of liquid or fluid into spray when forced through a small opening or orifice at high pressure.
- AY Documents Technical and informational documents published by the Spray Polyurethane Foam Alliance (SPFA) for use by members and distribution to the public. (The "AY" designation was developed as part of a numbering system by the Society of the Plastics Industries. All documents originating within the spray polyurethane foam organization were numbered "AY-xxx.")
- **B-Side** (B-component) One component of a two-component system. For polyurethane foam and coatings, the resin component.
- **Capacitance Meter** A device used to detect moisture or wet materials within a roof system by measuring the ratio of the change to the potential difference between two conducting elements separated by a nonconductor.
- Capillary Action,The movement of liquid in the interstices of insulation or other porous materialCapillarityas a result of surface tension.
- CatalystAn ingredient in a coating or polyurethane foam system that initiates a chemical
reaction or increases the rate of a chemical reaction.
- **Cavitation** The vaporization of a liquid under the suction force of a pump. Usually due to inadequate flow to a pump; the vaporization can create voids within the pump or the pump supply line. In polyurethane foam spray pumps, cavitation will result in OFF-RATIO FOAM.
- Cellular Describes a composition of plastic or rubber with relative density decreased by the presence of cells dispersed throughout its mass. In closed-cell materials, the cells are predominately separate from each other. In open-cell materials, the cells are predominately interconnected.
- Centipoise(cps) A unit of measure of absolute viscosity. (Note: The viscosity of water is one
centipoise at 200C (680F). The lower the number, the less the viscosity.)
- CFC Chlorofluorocarbon. A physical blowing agent containing at least one carbon, one fluorine and one chlorine atom in its structure (for example: CFC-11). Their use was phased out in the US as a spray foam blowing agent between 1993 and 1996.
- CheckingA defect in a coated surface characterized by the appearance of fine fissures in
all directions. Designated as "surface checking" if superficial, or "through
checking" if extending deeply into the coating or to an adjoining surface.



Coal Tar	A dark brown to black hydrocarbon obtained from the destructive distillation of coal. Used in built-up roofs or in below grade construction as a waterproofing agent. Coal tar when mixed with mineral spirits will produce a yellow- green to amber color but will not dissolve.
Coalescence	The formation of a film of resinous or polymeric material when water evaporates from an emulsion or latex system, permitting contact and fusion of adjacent latex particles. Action of the joining of particles into a film as the volatile evaporates.
Coarse Orange Peel Surface Texture	A surface showing a texture where nodules and valleys are approximately the same size and shape. This surface is acceptable for receiving a protective coating because of the roundness of the nodules and valleys. This surface requires at least 25% additional material to the theoretical amount. (AY-145 Surface Texture of Spray Polyurethane Foam.)
Coating	A layer of material applied over a surface for protection or decoration. Coatings for polyurethane foam are liquids, semi-liquids, or mastics; spray, roller, or brush applied; and are elastomeric.
Cobwebbing	Production of fine filaments instead of the normal atomized particles when some coatings are sprayed.
Colloidal Dispersion	A mixture wherein a finely divided material is uniformly distributed within a liquid. Latex emulsion is a colloidal dispersion of resin in water.
Copolymer	A polymer consisting of molecules containing large numbers of units two or more chemically different types in irregular sequence.
СРІ	Center for the Polyurethanes Industry, a division of the American Chemistry Council, whose members include producers or distributors of chemicals and equipment used to make polyurethane products.
cPVC	Chlorinated polyvinylchloride. A thermoplastic resin used to form sprinkler and high temperature water piping and fittings.
Cracking Resistance	the ability of a coating to resist breaks of the film where the breaks extend through to the surface painted and previously applied coating or the substrate is visible. The use of a minimum magnification of 10 diameters is recommended in cases where it is difficult to differentiate between cracking and checking.
Crawling	The defect in which the wet film recedes from localized areas of the substrate (usually caused by insufficient wetting) leaving those areas uncoated.
Cream Time	After mixing the two SPF-forming components the cream time occurs when the mixture changes from a clear dark-colored liquid to an opaque light-colored liquid. The cream time represents the onset of the rise of the foam.



Creep	(1) The permanent deformation of a material caused by slow movement over time resulting from thermal or load stresses. (2) Lateral movement of expanding foam.
Cross Hatch	An application method for liquid applied materials whereby successive layers or passes are applied at 90 degrees to the previous application.
Crossover	An undesirable mixing of iso- and resin-components as a result of unbalanced pressures at the spray gun. May result in an equipment blockage.
Cover Board	An insulation board used over closed cell plastic insulation (e.g., polyisocyanurate) to prevent blistering when used in conjunction with hot bituminous membranes.
CUFCA	Canadian Urethane Foam Contractors Association
Cure	The completeness of the chemical reaction. At substantial completion, the foam should have near the maximum physical properties attainable for the particular formulation used. Cure is not directly related to levels of product emissions during or after SPF application
Diisocyanate	An organic chemical compound having two reactive isocyanate (N=C=O) groups; used in the production of polyurethane foams and polyurethane coatings.
Elastomer	A material which at room temperature is capable of being stretched repeatedly at least twice its original length (100% elongation) and, upon release of stress, will return to its original dimensions.
Elongated Cells	Excessively large cells in foam or coating generally caused by off-ratio materials, moisture contamination, or excessive heat.
Embodied Energy	The quantity of energy required to manufacture, and supply to the point of use, a product, material or service.
Emissivity	The ability of a material to radiate or absorb radiant energy. Emissivity is usually expressed as a number $(0 - 1)$ or a percentage $(0\% - 100\%)$ which is determined at infrared wavelengths; the higher the number the greater the ability of material to absorb and radiate infrared radiation.
Emulsion	A colloidal dispersion of one liquid in another.
Ероху	A class of synthetic, thermosetting resins, which produce tough, hard, chemical- resistant coatings and adhesives.
ESR	Evaluation Service Report
Exothermic Reaction	A chemical reaction that produces heat. SPF and certain coatings are the product of exothermic reactions.



Fast Set	A term applied to a coating to indicate a faster curing time versus a standard version of the generic coating. In polyurethane and polyurea coatings this is generally indicative of cure times in the range a few seconds to a few minutes or coatings that must be sprayed with plural component equipment. In acrylic coatings, this is generally indicative of a 1-3-hour cure schedule versus 2-5 hour at 75°F.
Feathered Edge	The thin tapered outside edge of a polyurethane foam pass.
Filler	A relatively inert ingredient added to coating or polyurethane foam formulations to modify physical characteristics.
Film Thickness	The thickness of a membrane or coating. Wet film thickness is the thickness of a coating as applied; dry film thickness is the thickness after curing. Film thickness is usually expressed in mm or mils (thousandths of an inch).
Fire-retardant Coating	A coating that will do one or more of the following: (1) reduce the flame spread on the substrate over which the coating is applied, sometimes at the sacrifice of the coating (2) resist ignition of the substrate when exposed to high temperature; or (3) insulate the substrate to which the coating is applied and thereby prolong the time required to reach its ignition, melting or structural- weakening temperature.
Fisheye	Coating defect that manifests itself by the separation of wet coating into a recognized pattern resembling small "dimples" or "fish eyes".
Fishmouth	(Also referred to as" edge wrinkle.") 1) A half-cylindrical or half- conical shaped opening or void in a lapped edge or seam, usually caused by wrinkling or shifting of ply sheets during installation; 2) In shingles a half-conical opening formed at a cut edge.
Flash and Batt	(Hybrid Insulation) A combination of insulation types typically arranged so the SPF insulation acts as an air barrier and/or a vapor retarder, and the other insulation type contributes by adding R-Value.
Flash Coat	A thin initial pass of a spray-applied material.
Flash Ignition Temperature	The lowest temperature of a material required to initiate combustion in the presence of a spark or flame.
Flash Point	The lowest temperature of a material at which it gives off vapors sufficient to form an ignitable mixture with air near its surface.
Fluorocarbons	A chemical that contains both a carbon and a fluorine atom in its structure. They are traditionally used as physical blowing agents for polyurethane foam



products. There are three common classes of these material used as blowing agents: CFC, HCFC and HFC.

- **Foam Stop** The roof edge treatment upon which polyurethane foam is terminated.
- **Friability** The tendency of a material or product to crumble or break into small pieces easily.

Froth Pack Pressurized containers of polyurethane foam components.

Glass Eyes or Glass A thin clear membrane that forms over elongated polyurethane foam cells. Glass **Windows** eyes may break when coated, forming a PINHOLE.

Gloss The shine, sheen, or luster of a dried film.

- GranuleSize No. 11 ceramic aggregate embedded into wet coating over polyurethane
foam for aesthetics, traction, and mechanical resistance.
- Hardness Ability of a coating film, as distinct from its substrate, to resist cutting, indentation, or penetration by a hard object.
- HCFC Hydrochlorofluorocarbon. A physical blowing agent containing at least one carbon, one fluorine, and one chlorine atom in its structure (for example: HCFC-141b). Effective January 1, 2005, the U.S. Environmental Protection Administration (EPA) issued a "Use Ban" regulation on HCFC-141b blowing agent, meaning that SPF systems containing HCFC141b could not be domestically produced or imported, under penalty of law, after this date. The regulation also required that any existing inventory of finished product containing HCFC 141-b could not be applied after June 30, 2005.
- Heat Aging Controlled exposure of materials to elevated temperatures for a period of time.
- **Heat Flux** The rate of heat transfer per unit area. Usually used to describe the rate of radiant heat transfer. Units are W/m2 (Btu/ft2•hr).
- **Heat Sink** A cold substrate that absorbs the SPF exothermic heat, slowing down the reaction and/or rise of the polyurethane foam or coating.
- HFC Hydrofluorocarbon. A physical blowing agent containing at least one carbon and one fluorine atom in its structure (for example: HFC-245fa). They have no ozone depletion potential
- **Hiding Power** The ability of a coating to hide or obscure a surface to which it has been uniformly applied.



- Holidays Application defects whereby small areas are left uncoated.
- **Hybrid Insulation** A combination of insulation types typically arranged so the SPF insulation acts as an air barrier and/or a vapor retarder, and the other insulation type contributes by adding R-Value.
- **Hydrophilic** Having an affinity or attraction for water; having the ability of uniting with or dissolving in water. "Water loving."
- Hydrophobic Having no affinity for water; not compatible with water. "Water fearing."
- **Hygroscopic** Attracting, absorbing, and retaining atmospheric moisture.
- **Hygroscopicity** The capacity of a compound or substance to absorb water.
- Ignition Barrier A building code permitted protective covering applied over foam plastic insulations, including SPF, in attics and crawlspaces to increase the time it takes for the foam plastic to become involved in a fire. Ignition barriers do not provide as much fire protection as THERMAL BARRIERS (see also). The building code restricts the use of ignition barriers to attics and crawlspaces of limited access (check the local building code for exact requirements).
- **Impingement Mixing** A process of mixing in which multiple liquid streams are forced toward one another at high velocity, producing very thorough mixing in a short time.
- Interlaminar Adhesion between polyurethane foam passes or coating passes.
- Adhesion
- Intumescent Coating Coatings which are formulated to swell and char when exposed to heat. When applied to a combustible (or non-combustible) substrate, this "swollen char" is designed to insulate the substrate from the heat source, thus reducing the potential and/or increasing the time that the substrate becomes involved in a fire.
- isocyanate (A-Component) One component of a two-component system. For polyurethane foam and coatings, the isocyanate component.
- Isocyanurate Also referred to as PIR, polyiso, or polyisocyanurate, it is essentially a modified polyurethane (PUR) foam. The proportion of methylene diphenyl diisocyanate (MDI) is higher than for PUR and instead of a polyether polyol resin, a polyester derived polyol is used in the reaction. Catalysts, blowing agents and additives used in PIR foam formulations also differ from those used in PUR.
- **k-Factor** Thermal conductivity for a unit thickness of material. Expressed as W/m2•K (Btu•in/hr•ft2•F). R-VALUE (see also) is equal to the thickness of the material divided by the k-factor (R = x/k where x = thickness).



- Knit LineA high-density skin formed between one lift or pass of foam and another
Synonymous with LIFT LINE.
- Krebs Units (K.U.) A measurement of viscosity for materials that have the property of changing resistance to flow when under shear. Such materials are called THIXOTROPIC. Measuring is accomplished with a Krebs/Stormer viscometer. See also Thixotropic
- Laitance A layer of weak non-durable material containing cement and fines, brought by bleeding water to the top of over-wet concrete. Laitance may be detected by scraping the concrete surface with a putty knife; if a quantity of loose powdery material is observed or easily removed, excessive laitance may be considered to be present.
- LatexA colloidal dispersion of a polymer or elastomer in water that coalesces into a
film upon evaporation of the water.
- Lift The sprayed polyurethane foam resulting from tying together the perimeter of adjacent passes of foam in a specific area, as shown in Figure A below. A lift is defined by its thickness. Multiple lifts over the same area may be needed to achieve the final foam thickness. For example, a one-inch lift of foam can be installed over a 20 x 20 ft area, and then a second lift of foam 1.5 inch thick can be installed to the same area to create a final installed thickness of 2.5 inches. For small areas, such as between framing members, a lift of foam is synonymous with a pass of foam per Figure B below.



LIFT FIGURE A: Lift definition for low-slope roofing



LIFT FIGURE B: Lift and pass are synonymous for SPF insulation applications



MDI

Medium-density SPF (Closed-cell SPF, ccSPF)	A type of spray polyurethane foam expanded with non-reactive blowing agents to yield a rigid cellular structure. It is characterized by a predominance of closed-cells and a density between 1.5 and 2.5 lb. per cubic foot.
Mil	One-thousandth of an inch; 0.001 inch (0.025 mm). A unit used to measure coating thickness.
Mud Cracking	The defect in an applied coating or mastic when it cracks into large segments or shrinks (also called alligatoring). When the action is fine and incomplete, it is usually referred to as "checking."
OCF	One-Component Foam.
Off-Ration Foam	An off-ratio foam is caused by a deficiency of one of the component chemicals (A- or B-side) during application. The reaction of an off-ratio foam is readily visible to the trained SPF applicator. Off-ratio foam will negatively affect SPF yield, performance, and worker safety.
Open Time	Length of time a coating remains wet enough to allow for brushing-in at the laps; also called wet edge time.
Optical Comparator	An eyepiece with magnification ranging from 4-12 power, with a scale used for measuring thickness.
Orange Peel Surface Texture	The surface texture of spray polyurethane foam which exhibits a fine granular texture and is compared to the exterior skin of an orange. This surface is considered acceptable for receiving a protective coating. This surface requires at least 10% additional coating material to the theoretical amount. (AY-145 Surface Texture of Spray Polyurethane Foam.)
Organic	Compounds containing carbon.
Outgassing	The slow release of a gas that was trapped, frozen, absorbed or adsorbed in some material. (Sometimes called "off-gassing," particularly when in reference to indoor air quality,)
Overspray	(1) Airborne spray loss of polyurethane foam or coatings. (2) Undesirable depositions of airborne spray loss.



- Overspray SurfaceThe surface shows a linear coarse textured pattern and/or a pebbled surface.TextureThis surface is generally downwind of the sprayed polyurethane path and is
unacceptable for proper coating coverage and protection, if severe.
- PAPR Powered Air Purifying Respirator.
- Pass The volume of coating or polyurethane foam applied by moving the gun from side to side and moving away from fresh material in a single continuous application. A pass is defined by its width, length and thickness. Foam passes sprayed and tied together along their adjacent edges to cover a larger area are called a lift of foam.
- Pass LinesPass lines are created when the end of a pass of foam or coating ties into an
adjacent pass. The overlapping of the polyurethane foam or coating can be seen
typically as a darker color than the middle of the pass Foam at the pass lines
typically contain thinner lifts than the middle of the foam pass as the applicator
tapers the foam to uniformly tie the foam passes together.
- PeelingTop-coating film inadequately bonded with undercoats resulting in partial
delamination or detachment of final coat.
- Perm A unit of water vapor permeance defined as 1 grain of water vapor per square foot per hour per inch of mercury water vapor pressure difference (1 inch of mercury = 0.49 psi). Perm = 1 grain/ft2•hr•in Hg. The SI unit for permeance is ng/s•m2•Pa (1 perm = 57.4 ng/s•m2•Pa).
- Perm RatingThe permeance of a material. Breather materials have relatively high perm
ratings, vapor retarders have relatively low perm ratings, vapor barriers have
essentially zero (negligible) perm ratings.
- Permeability, AirThe rate at which air will diffuse through a unit area of material induced by a
unit differential in air pressure. Air permeability is generally used as a descriptive
term and specific values are not usually reported.
- Permeability, WaterThe rate at which water vapor will diffuse through a unit thickness and area of
material, induced by a unit differential in water vapor pressure. Permeability
values are related to a common thickness and can be used to compare various
materials. Units are usually grains•in/ft2•hr•in Hg or perm•in. SI unit for
permeability is ng/s•m•Pa (1 perm•in = 1.46 ng/s•m•Pa).
- Permeance, AirThe rate at which air can diffuse or leak through a unit area of material induced
by a specific pressure differential (for example 75 Pa or 1.57 lb/ft2). ASTM E 2178
and ASTM E 283 are test methods used to measure air permeance. Units are
L/s•m2 (ft3/min•ft2) with pressure reported as Pa (lb/ft2).



Permeance, Water Vapor	The rate at which water vapor will diffuse through a unit area of material induced by a unit differential in water vapor pressure. Permeance values are reported for specific thicknesses (usually recommended application thickness). Units are usually grains/ft2•hr•in Hg or perm. SI unit for permeance is ng/s•m2•Pa (1 perm = 57.4 ng/s•m2•Pa).
рН	A measure of acidity/alkalinity of aqueous mixtures. A measure of pH 7 is neutral, lower is more acidic, higher is more alkaline.
Pigment	Finely ground insoluble dispersed particles (powder) which, when dispersed in a coating, may provide, in addition to color, resistance to UV radiation, better resistance to weathering, hardness, durability, reflectivity and other properties.
Pinhole	A surface defect in polyurethane foam and/or coating that appears as a small hole as if made by a pin. The term is generally applied to holes caused by expanding gases from solvents, moisture or other volatile compounds or SPF cells open to the surface.
Pinholes	small pore-like flaws in a coating that extend entirely through the applied film and have the general appearance of pin pricks when viewed by reflected light.
Plasticizer	A substance added to a plastic or coating to increase its flexibility or elongation.
Polymer	A substance consisting of high molecular weight chemical compounds characterized by chains of repeating simpler units.
Polymeric MDI (p- MDI)	Isocyanate compounds wherein the molecules contain more than two functional -NCO groups. See also: Methylene Diphenyl Diisocyanate (MDI)
Polymeric MDI (p- MDI)	Isocyanate compounds wherein the molecules contain more than two functional -NCO groups.
Polyol	A high weight molecule that contains hydroxyl groups (-OH), typically at the terminal position on the molecular chain. Polyol is a primary ingredient in the B-side, or resin, of the two-component polyurethane system. After reaction with MDI (A-side), the polyol becomes part of the polyurethane polymer.
Polyurethane Coatings	A one- or two-part coating that contains polyisocyanate monomer and a hydroxyl containing resin, which react during cure to form a polyurethane elastomer
Polyurethanes	Polyol and MDI react to form polyurethane. When this reaction occurs multiple times, a polyurethane molecule is created. Many end-use products are created using polyurethane chemistry, including: rigid and flexible foams, rigid or flexible coatings, elastomers, structural materials, etc.


- Popcorn SurfaceThe surface exhibits texture of SPF where valleys form sharp angles. This surfaceTextureis unacceptable for coating application. Also termed treebark surface texture.
(AY-145 Surface Texture of Spray Polyurethane Foam.)
- Post ExpansionA characteristic of some single-component SPFs wherein additional expansion
occurs after the initial application and froth expansion. Post expansion is due
mainly to the chemical curing process.
- Pot LifeThe period of time during which a multi-component or catalyzed material
remains suitable for application after being mixed.
- Pour FoamA polyurethane foam system, with a slower reactivity profile (relative to SPF),
designed for pouring or injection into confined spaces such as a mold, panel or
concrete blocks.
- PPE Personal Protective Equipment: Includes all protective equipment and supplies designed to protect employees from serious workplace injuries or illnesses resulting from contact with chemical, radiological, physical, electrical, mechanical, or other workplace hazards. Besides face shields, safety glasses, hard hats, and safety shoes, PPE includes a variety of devices and garments such as goggles, coveralls, gloves, vests, earplugs, and respirators.
- PrimerThe first layer of coating applied to a surface to improve the adhesion of
subsequently applied materials or to inhibit corrosion.
- PropellantLiquified or compressed gas formulated into single-component SPF or two-
component FROTH PACKS (see also) used to expel the SPF ingredients from its
containers. The propellant also functions as a BLOWING AGENT.
- **Proportioner** The basic pumping unit for spraying polyurethane foam or two component coating systems. Consists of two positive displacement pumps designed to dispense two components at a precisely controlled ratio.
- **Psychrometer** (1) A device for measuring ambient humidity by employing a dry bulb thermometer and a wet bulb thermometer. (2) An electronic device for measuring ambient temperature and humidity.
- **QUV** An apparatus used to simulate the effects of weathering of materials.
- Radiant BarriersTypically in the form of a single highly-reflective sheet or coating (e.g., aluminum
foil or metallized mylar) radiant barriers are applied as a component of the
building enclosure to inhibit heat transfer by thermal radiation. They do not
provide resistance to heat transfer by conduction or convection.
- **Razing, Craze Cracks** Fine, random cracks in forming a network on the surface of a coating or film.



Resin	1) Component-B in SPF. This component contains a polyol, catalyst, blowing agent, fire retardant, and surfactants. It is mixed with the A component to form polyurethane. 2) General term applied to a wide variety of more or less transparent and fusible products, which may be natural or synthetic. Higher molecular weight synthetic resins are referred to as polymers. 3) Any polymer that is a basic material for coatings and plastics.
Rust Blush	The earliest stage of rusting characterized by an orange or red color. Occurs frequently on freshly sandblasted steel if allowed to stand too long before coating.
R-Value	The resistance of a material to heat transfer. Insulators have relatively high R values. Units are °K•m2/W (°F•ft2•hr/Btu).
Sag	Undesirable excessive flow or run in material after application to a sloped or vertical surface.
SAR	Supplied Air Respirator
Scarf	To remove the surface or coating from polyurethane foam by cutting, grinding, or other mechanical means. Synonymous with SCARIFY.
SCV	Solid Content by Volume
SDS	Safety Data Sheet
Self-flashing	The ability of sprayed polyurethane foam to be applied around a penetration or at a roof transition without the need for other materials.
Service Temperature Limits	The maximum continuous temperature at which a coating, polyurethane foam, or other material will perform satisfactorily.
Set	To convert into a fixed or hardened state by chemical or physical action.
Set of foam	A container of A-side (MDI) and a container of B-side (polyol or resin blend) which can be combined through mixing equipment to form SPF. A set of foam consists of two containers, typically 55-gallon drums.
Shore Hardness	A measure of hardness based on the Shore scale.
Silicone Coating	A liquid-applied, solvent dispersed, elastomeric protective coating whose principal polymer in the dispersion contains more than 95 % silicone resin. Some high solids silicone coatings may have little or no solvent content.



- Single-componentA fully formulated foam system packaged in a single aerosol can or pressurizedFoamcylinder. Essentially a moisture cure polyurethane prepolymer in a pressurized
container. (Also called One-Component Foam or OCF.)
- **Skinning** The formation of a dense film on the surface of a liquid coating or mastic.
- Slit SamplesSmall cut samples approximately 2" long, ½" wide, and ¾" deep which are taken
for evaluation of sprayed materials.
- Smoke Developed The amount of smoke measured for a sample tested in the ASTM E 84 tunnel test when compared to inorganic reinforced cement board and select-grade redoak flooring which have been arbitrarily established as zero and 100, respectively.
- Smooth SurfaceThe surface texture of SPF which exhibits spray undulation and is ideal for
receiving a protective coating. Even though the surface texture is classified as
smooth, this surface requires at least 5% additional coating material to the
theoretical amount. (AY-145 Surface Texture of Spray Polyurethane Foam.)
- Solar ReflectanceA calculated index (0 100+ based on ASTM E 1980) which combines a surface
material's solar reflectance and infrared emittance into a single value. The SRI
provides a relative indication of how hot a surface material will become when
exposed to sunlight. Cool surfaces have high index values while hot surfaces
have low index values.
- Solid ContentThe percentage of non-volatile matter in a coating or mastic formulation; may
be expressed as a volume or weight percent.

Solvent A liquid that dissolves other substances

- **SPF, High Pressure** Spray polyurethane foam where the A- and B- components are delivered at a pressure between 1000 and 1300 psi, at a rate up to 30 lb/min wherein the components are atomized, and impingement mixed in a spray gun.
- **SPF, Low Pressure** Spray polyurethane foam where the A- and B- components are delivered a pressure of less than 250 psi, at a rate between 5 and 7 lb/min wherein the components are mixed using a static mixing nozzle. Components are typically delivered in pressurized tanks.
- Spray PolyurethaneA foamed plastic material formed by the reaction of an isocyanate and a polyol
and employing a blowing agent to develop a cellular structure. SPF may be a
two-component reactive system mixed at a spray gun or a single-component
system that cures by exposure to moisture. SPF can be formulated to have
physical properties (such as density, compressive strength, closed cell content,
and R-value) appropriate for the application requirements. Common uses of SPF
include insulation, air barrier and roofing membrane.



Spud	To remove the roofing aggregate and most of the bituminous top coating by scraping and chipping.
Stress-crack	External or internal cracks within a material caused by long term stress.
Surface Texture	The resulting surface from the final pass of SPF. The following terms are used to describe the types of SPF surfaces: smooth, orange peel, coarse orange peel, verge of popcorn, popcorn, treebark, and overspray.
Surfactant	Short for "surface active agent." Used to alter the surface tension of liquids. An ingredient in polyurethane foam formulations to aid in mixing and controlling cell size.
Tack-free	A curing phase of polyurethane foam wherein the material is no longer sticky.
Tack-free Time	The time between the start of mixing the two SPF-forming components and the time that the surface of the foam can be touched with a wooden stick without it sticking
Thermal Shock	The stress producing phenomenon resulting from sudden temperature drops in a roof membrane, for example, a rain shower following brilliant sunshine.
Thinner	A liquid used to reduce the viscosity of coatings or mastics. Thinners evaporate during the curing process. Thinners may be used as solvents for cleanup of equipment.
Thixotropic	Having the property of decreasing viscosity with increasing shear stress. A coating is thixotropic if it thins with stirring or pumping but thickens back up when movement ceases.
Tie-in Lines	The starting or stopping point at which new foam is applied to foam which had been sprayed earlier.
Tint	A color produced by the introduction of small amounts of a colored pigment.
Ultra-violet Radiation	Electro-magnetic radiation beyond the visible spectrum at its violet end. Invisible high-energy sunlight which degrades many organic materials.
Verge of Popcorn Surface Texture	The verge of popcorn surface is the roughest texture suitable for receiving the protective coating. The surface shows a texture where nodules are larger than valleys, with the valleys relatively curved. The surface is considered undesirable due to the additional amount of coating required to protect the surface. This surface requires at least 50% additional material to the theoretical amount. (AY-145 Surface Texture of Spray Polyurethane Foam.)
Viscosity	The thickness or resistance to flow of a liquid. Viscosity generally decreases as temperature increases.



- **Water Absorption** The percent increase in weight of a specimen after immersion in water for a specified time. For SPFs, water absorption is reported as volume percent in accordance with ASTM D 2842.
- **Water-blown Foam** A spray polyurethane foam (SPF) formulation of any density which uses water as the predominant (reactive) blowing agent.
- Windscreen A device to minimize the effects of wind on coating or polyurethane foam application.
- WUFI A computer-based, one-dimensional model to simulate transient heat and moisture transfer through building assemblies, developed by the Fraunhofer Institute in Holtzkirchen, Germany. WUFI can be used to predict condensation, moisture accumulation and mold growth potential in building assemblies. WUFI is an acronym for the German phrase Wärme Und Feuchte Instationär (translation: Transient Heat and Moisture).

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Quality Assurance Standards

October 2019

The information contained in this supplement serves as a criteria for Specifiers and Authorized Applicators regarding the design and installation of Carlisle Roof Foam and Coatings (CRFC) roofing systems and related products. Additional information essential for the design and installation of the Roof Systems are also included in the respective Specification for each Roof System and in the Design Reference Section of as well as the applicable Spec Supplement.

	SPF Test Methods		
Applicable			
reference			
ASTM Number	Standard/Test Method ASTM International		
	Standard Test Method for Steady State Thermal Transmission Properties by Means of		
ASTM C518	the Heat Flow Meter Apparatus		
ASTM D5469	Standard for SPF Roofing Systems		
ASTM D1621	Standard Test Method of Compressive Properties of Rigid Cellular Plastics		
ASTM D1622	Standard Test Method for Apparent Density of Rigid Cellular Plastics		
	Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Heat		
ASTM D2126	Aging		
	Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular		
ASTM D1623	Plastics		
ASTM D6226	Standard Test Method for Open Cell Content of Rigid Cellular Plastics		
ASTM E84	Standard Test Method for Surface Burning Characteristics of Building Materials		
	Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet		
ASTM D4263	Method		
ASTM E96	Standard Test Methods for Water Vapor Transmission of Materials		
ASTM E108 or			
UL 790	Standard Test Method for Fire Tests of Roof Coverings		
ASTM C2842	Water Absorption		
	Single-Ply, Polymer-Modified Bitumen Sheet, Built-Up Roof (BUR) and Liquid Applied		
FM4470	Roof Assemblies for use in Class 1 and Noncombustible Roof Deck Construction		
UL 1256	Standard for Fire Test of Roof Deck Constructions		
SPFA AY 104	Spray Polyurethane Foam Systems for New and Remedial Roofing		
NRCA	Sprayed Polyurethane Foam-Based Roofing Manual		



Coating Test Methods			
Applicable			
reference			
ASTM Number	Standard/Test Method ASTM International		
ASTM D1644	Standard Test Methods for Nonvolatile Content of Varnishes		
ASTM D2370	Standard Test Method for Tensile Properties of Organic Coatings		
	Standard Test Method for Determination of Emittance of Materials Near Room		
ASTM C1371	Temperature Using Portable Emissometers		
	Standard Test Method for Volume Nonvolatile Matter in Clear or Pigmented		
ASTM D2697	Coatings		
	Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet		
ASTM D4263	Method		
	Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-		
ASTM E1980	Sloped Opaque Surfaces		
	Standard Test Method for Determination of Solar Reflectance Near Ambient		
ASTM C1549	Temperature Using a Portable Solar Reflectometer		
ASTM D471	Standard Test Method for Rubber Property—Effect of Liquids		
ASTM D522	Standard Test Methods for Mandrel Bend Test of Attached Organic Coatings		
	Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and		
ASTM D624	Thermoplastic Elastomers		
ASTM D1475	Standard Test Method For Density of Liquid Coatings, Inks, and Related Products		
	Standard Specification for Liquid-Applied Silicone Coating Used in Spray		
ASTM D6694	Polyurethane Foam Roofing Systems- move to Silicone section		
ASTM D6083	Standard Specification Liquid-Applied Acrylic Coating Used in Roofing		

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Spray Foam Equipment General

October 2019

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SPF equipment is integral to the entire process of applied spray foam: from transferring the components out of the 55-gallon material drums, to properly heating and pressurizing the materials, to pumping them through hoses, to finally mixing and spraying the components.

How Does Work?

The two components that combine to make spray polyurethane foam (SPF) (Side A: isocyanate, and Side B: polyol resin) are typically supplied in 55-gallon drum sets, which must be shipped and stored according specific procedures. Once in use on the job site, they are transferred from the drums to the proportioning machine via specialized transfer pumps.

Spray foam machines have two metering, or proportioning, pumps (one for each component) that heat and proportion the isocyanate and polyol in a 1:1 ratio. The two materials move through the machine (commonly referred to as a proportioner) starting at the proportioning pumps, through the primary heaters, through the heated hoses, and out to the spray gun. The isocyanate and polyol resin materials are kept separated through the entire system until they come together in the spray gun, where they are mixed and spray-applied to the target substrate.

Spare Parts / Auxiliary Equipment



Heated Hoses

Getting the heated Side, A & Side B materials from the proportioner to the spray gun requires specialized hoses through which the material is transferred, being heated along the way to maintain the desired temperature. Heater hose is generally available in 25, 50, or 100-foot lengths, and features heating elements, temperature controllers, insulation, and protective jackets to prevent puncturing.

Heated hose systems can reach prodigious lengths, and often that's a necessity in the spray foam industry. For example, in commercial roofing applications, it isn't always feasible to maneuver a spray rig close to where the spray area is located, so it's not uncommon to see total hose lengths of up to 400 feet (four 100-foot sections of hose). But that's not to say that project specifics determine the length of heated hose used for a given application. In fact, it's the performance characteristics of the proportioner that define the maximum hose length.

Because heated hoses don't heat up the material, but rather prevent the material from cooling down too much as it's pumped through the hose, it's the job of the proportioner to raise the materials' temperatures sufficiently high enough to reach the end of the hose length in the optimal temperature range. So, less powerful proportioners might have max hose lengths of 200 feet, while proportioners intended for commercial and industrial applications can handle hoses twice that long.

Auxiliary Equipment

In addition to proportioners, spray guns, and heated hoses, you will typically find much more equipment and power utilities involved before, during, and after a spray foam application.

Prior to spraying foam, the substrate might need to be prepared to optimize adhesion. Surface prep might require power-washing or abrasive-blasting equipment. Also, a substrate might need to be primed, which entails the use of single-component airless sprayers.

Obviously, powered equipment used in an SPF application requires electricity, which is typically supplied by a mobile generator, unless power is available at the job site. The generator needs to be properly sized, which is to say powerful enough to handle the full load amperage draw of all powered application equipment.

Several pieces of equipment in a typical SPF rig are pneumatic or require air to operate. This equipment can include the spray guns and the transfer pumps that supply the material to the machines from the 55-gallon drums. To address this need, most spray foam equipment systems include electric air compressors to supply compressed air to the pneumatic equipment as needed during an application.

Spray Guns

Spray guns are precisely engineered pieces of equipment that perform the most critical functions of the SPF application process: mixing the chemical components and spraying it to the target substrate. Most polyurethane foam spray guns on the market use impingement-mixing technology to combine the chemicals inside the gun. When the trigger is pulled, equal amounts of the two chemical components enter the mixing chamber, where they begin to react. Because the fluid is under pressure, the mixture is immediately forced out of the chamber through a small orifice, thereby atomizing into a spray as it exits the gun.

It is important to understand that if all the reacted material is not expelled from the gun once the trigger is released, the material will start to cure and harden inside the gun, rendering it unusable. So, it is critical to completely remove, or purge, the gun of every particle of reacted material. There are three ways to do this, each representing a different class of spray gun: mechanical purge, air purge, and solvent purge.

Mechanical Purge



Mechanical purge serves two functions in a spray gun. A valving rod is set inside the mixing chamber of the gun. When the gun is not triggered, the valving rod remains static and blocks the two chemical ports. When the gun is triggered, the valving rod withdraws, opens the two chemical ports to let the polyol resin and isocyanate materials into the mixing chamber. When the trigger is released, the rod comes forward to close off the two chemical ports and in doing so, purges the remaining mixed material out of the gun.

Air Purge

Air purge guns remove material from mixing chamber and gun block with a quick blast of air. In air purge guns, the mixing chamber itself moves back and forth as the trigger is pressed and released. When the trigger is pulled, the mixing chamber retracts, which opens the fluid ports and allows the chemical components to enter the mixing chamber and exit the gun as a spray. When the trigger is released, the mixing chamber moves forward, blocking the fluid ports and opening special ports that allow air to flow through the mixing chamber and blow away any present material.

Solvent Purge

Solvent purge is less common for spray foam applications than it is for coating applications. Solvent purge spray guns flush a cleaning solvent through the gun to neutralize the chemical reaction and then wash out the inside of the gun. This isn't favorable since solvents can add extra costs in terms of purchasing and disposal, and they can be harmful to the operators and the environment

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Primers and Coatings

October 2019

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General

This Spec supplement contains information on primers and coatings used in conjunction with CRFC SPF coating and restoration systems. Additional information pertain to product application safety precautions and limitations can be found on the applicable product data sheet. Tables 8 & 9 which contain the various primer types required for coating applications over different types of roofing systems can be found at the end of this supplement.

Primers

1. Prime-Tek Epoxy Primer

Is a two component, 1:1 ratio "A" is white, and part "B" is black to dark grey, the combined product is medium grey and is a water-based primer. Adheres well to most metals, organic and synthetic polymers, wood, masonry and vitreous surfaces. This primer may also be used as masonry block filler. Do not use on copper or silver. Once mixed, material has a useable pot life of 2 hours maximum at 75°F.

Table 1



Physical Property	Test Method	Prime-Tek Epoxy Primer Part A and B
Solids Content by Weight, %	ASTM D 1644	60 ±2
Solids Content by Volume, %	ASTM D 2697	42.5 ±2
Density, lbs/gal	ASTM D 1475	12.3 (A) 7.9 (B)
VOC, g/l	EPA Method 24	<50
Cure Time @ 75°F		Dry to touch 0.5-1.5 hours
_		Full cure 12-24 hours
Shelf Life		1 yr

Product Limitation

Protect from freezing during shipping and storage. Do not apply to surfaces, which are below 50°F. Do not apply when it is raining or if the threat of rain exists. Do not apply when the dew point is less than 5°F above ambient temperature. Refer to PDS and SDS for additional product information. Once mixed usable pot life is 2 hours maximum at 75°F.

2. Prime-Tek Acrylic General Purpose Primer (Black)

This primer is suitable when a fast-drying, primer is needed. This product may be used on many surfaces for effective protection: BUR, Metal, Concrete (min 30 day cured), Polyurethane Foam, acrylic coatings and Masonry.



Physical Property	Test Method	Prime-Tek Acrylic General Purpose Primer		
Solids Content by Weight, %	ASTM D 1644	45±2		
Solids Content by Volume, %	ASTM D 2697	38±2		
Density, lbs/gal	ASTM D 1475	9.4		
VOC g/l	EPA Method 24	<50		
Cure Time		Dry to touch @ 75°F in 0.5 -1 hours,		
		Full cure in 2-6 hours		
Shelf Life		1 yr		

Product Limitation

Protect from freezing during shipping and storage. Do not apply when it is raining or if the threat of rain exists. Do not apply when the dew point is less than 5°F above ambient temperature. Subsequent coats should be applied within 48 hours of prior applications to ensure full and uniform adhesion. Do not use on new concrete (less than 30 days). Refer to PDS and SDS for additional information.

3. Prime-Tek Bleed Block Primer (Red)

This primers is a water-based, rust-inhibiting primer developed to block "bleed-through" from mod bit and asphaltic substrates. This primer dries quickly allowing for reduced time before elastomeric coating or can be used to temporarily protect SPF from UV exposure. This can be used as a prime coat over modified bitumen, BUR and other asphaltic substrates. The product can be applied to wide range of substrates which include, but are not limited to, wood, metal, concrete and masonry.

Table 3



Physical Property	Test Method	Prime-Tek Bleed Block Primer
Solids Content by Volume, %	ASTM D 2697	38±2
Density per Gallon (A&B), lbs/gal	ASTM D 1475	10.1
VOC, g/l	EPA Method 24	<50
Cure Time		Dry to touch @ 75°F in 0.5 -1 hour, Full cure in 2-8 hours
Shelf Life		1 yr

Product Limitations

Protect from freeing during shipping and storage. Do not store material at temperatures below 50F (10°C). Do not apply when ambient air and substrate temperature fall below 50F (10°C) or when inclement weather is in the forecast. Refer to PDS and SDS for additional information.

4. Prime-Tek Tie-in Primer (Translucent black)

Prime-Tek Tie-In Primer is a single-component, solvent-based polyurethane primer that provides outstanding adhesion to various substrates, including polyurethane and polyurea coatings. This product is translucent black in color and is ideal for use as a bonding or tie coat primer over aged polyurea and urethane coatings and can be used over other substrates such as metal, concrete, and wood.

Table 4

Physical Property	Test Method	Prime-Tek Bleed Block Primer
Solids Content by Volume, %	ASTM D 2697	30±2
Solids Content by weight, %	ASTM D 1644	26±2
Density (A&B), lbs/gal	ASTM D 1475	7.7
VOC, g/l	EPA Method 24	643
Cure Time		Full @ 75°F in 2 - 4 hours,
Shelf Life		1 yr

Product Limitations



Protect from freeing during shipping and storage. See Safety Data Sheet (SDS) for complete safety information. Use a NIOSH certified respirator when applying this product. Use only in a well-ventilated area. Do not allow vapor from material to be drawn into buildings through air intakes or open windows. Water will cause the product to generate CO2, which can pressurize closed containers. Primer should be use within one week of opening. Refer to PDS for additional information.

For list of approved substrates with approved primer contact CRFC.

Coatings

Table 5

Available Coating				
SeamlesSEAL [™] Ultra Silicone		SeamlesSEAL Acrylic		
Acronym		Acronym		
LS	Low Solids	TC	Top Coat	
HS	High Solids	BC	Base Coat	
HSLV	High Solids Low VOC	HT	High Tensile	
		QS	Quick Set	
		BB	Bleed Block	
		FR	Fire Rated	

A. SeamlesSEAL Ultra Silicone Coating

The silicone roof coating membrane shall consist of an elastomeric, liquid applied material, domestically engineered and produced. The coating can be installed in one or multiple coats. The product is suitable for application through airless spray equipment, roller, spreader bar, squeegee, or brush. Refer to table 5 for available type of coatings.

Note: The following table shows the physical properties for the SeamlesSeal Ultra HS and LS. For other silicone coatings, the applicable product data sheet should be referenced for product physical properties.



Physical Property	Test Method	SeamlesSEAL Ultra HS Silicone Coating	SeamlesSEAL Ultra LS Silicone Coating
Volatile Organic Content (VOC), (g/l)	EPA Method 24	<50	<250
Tear Resistance, lbs/in	ASTM D 624	26	37
Tensile Strength, die C, psi	ASTM D 412 ASTM D 2370*	307* @73°F 484* @ 0°F	460 @73°F
Elongation, %	ASTM D 412 ASTM D 2370*	205* @73°F 307* @ 0°F	235 @73°F
Permeability, perms	ASTM E 96B	9.3	6.1
Solar Reflectivity (White)	ASTM C 1549	0.7 (3 year aged)	0.66 (3 year aged)
		0.87 (initial)	0.85 (initial)
Emissivity (White)	ASTM C 1371	0.9 (3 year aged)	0.9 (3 year)
		0.89 (initial)	0.85 (initial)
Solar Reflectance Index (SRI) (White)	ASTM E 1980	110	106
Low Temperature Flexibility	ASTM D 522 Method B	-15°F (-26°C) Pass	-15°F (-26°C) Pass
Solids Content by Weight %	ASTM D 1644	95±2	80±2
Solids Content by Volume %	ASTM D 2697	96±2	69±2
Cure Time	@100°F & 90% Humidity @40°F & 20% Humidity	Min 2hrs Max 8-12 hrs	Min 2hrs Max 8-12 hrs
Shelf Life		1 year	1 year

B. SeamlesSEAL Acrylic Coatings

1. SeamlesSEAL Acrylic

SeamlesSEAL Acrylic Coating is a 100% acrylic, single-component, water-based, premium quality elastomeric coating for spray, brush, or roller application. This product is designed to provide protection for a wide range of building surfaces such as roofs, vertical walls, masonry, and spray polyurethane foam (SPF) roofing systems. It is excellent for waterproofing and restoring existing roof systems, as well as for weather protection of SPF roofing systems. SeamlesSEAL Acrylic coating is applied in 2 coats, a base coat (BC) and a top coat (TC) for finishing. SeamlesSEAL TC can be used as a top or base coating or in single coat applications. SeamlesSeal BC can be used as a basecoat in two-coat applications but is not recommended as the top finish coat.

2. SeamlesSEAL HT



SeamlesSEAL HT Acrylic Coating is a 100% acrylic, single-component, water-based, high tensile strength, elastomeric coating. This product is suitable for spray, brush, or roller application and is designed to provide protection for a wide range of building surfaces, such as roofs, vertical walls, masonry, and spray polyurethane foam (SPF) roofing systems. It is excellent for waterproofing and restoring existing roof systems, as well as for weather protection of SPF roofing systems

3. SeamlesSEAL BB

SeamlesSEAL BB Acrylic Coating is a 100% acrylic, single-component, water-based, highquality elastomeric coating for spray, brush, or roller application. SeamlesSEAL BB is designed for use as an acrylic base coating to block bleed-through from asphaltic substrates, PVC, and slight rust. It is excellent for waterproofing and restoring existing roof systems, as well as prepared PVC, metal, and asphaltic surfaces. Use SeamlesSEAL BB with SeamlesSEAL acrylic top coats for a premium coating system.

Refer to Table 5 for available types of coatings.

Physical Property	Test Method	SeamlesSEAL Acrylic Coating (TC)	SeamlesSEAL HT	SeamlesSEAL BB
Tensile Strength, psi (Max @ 73°F)	ASTM D 2370	273	475	300
% Elongation @ Break (73°F)	ASTM D 2370	262	580	304
Volume Solids, %	ASTM D 2697	55 ±2	55±2	55±2
Weight Solids, %	ASTM D 1644	68±2	65±2	69±2
Volatile Organic Content (VOC), (g/l)	EPA Method 24	<50	<50	<50
Tear Resistance (Die C), lb f/in	ASTM D 6694/ 624	88	130	
Permeance, perms	ASTM D 1653B	17	12	4
Low Temp Flex	ASTM D 522	Pass	Pass	Pass
Solar Reflectivity	ASTM C 1549	0.88	0.87	
Emissivity (white)	ASTM C 1371	0.90	0.88	
Solar Reflectance Index (SRI) (White)	ASTM E 1980	111	110	
Drying Time		Recoat 12-24 hrs Tack Free 2-12 hrs	Recoat 12-24 hrs Tack Free 2-12 hrs	Recoat 12-24 hrs Tack Free 4-5 hrs
Shalf Life		1 voor	1 voor	1 voor
Shelf Life		1 year	i year	i year

Table 7

General Substrate Recommendations- Contact CRFC for additional recommendations



Table 8

SeamlesSEAL Ultra Silicone				
		Pressure		
Roof Surface	Cleaner	Wash	Primer	
New EPDM	Prime-Tek Membrane Cleaner	Yes	N/A	
Aged EPDM*	Prime-Tek Membrane Cleaner	Yes	N/A	
New TPO	N/A	N/A	Prime-Tek TPO	
Aged TPO*	Prime-Tek Membrane Cleaner	Yes	Prime-Tek TPO	
New PVC/KEE				
Aged PVC/KEE*	Prime-Tek Membrane Cleaner	Yes	Prime-Tek Bleed Block	
Hypalon [®] *	Prime-Tek Membrane Cleaner	Yes	N/A	
New Ferrous Metal,				
Galvanized, or				
Galvalume finished	N/A	Yes	N/A	
Aged Ferrous Metal,				
Galvanized, or Galvalume finished*	N/A	Voc	Prime-Tek Bleed Block	
Now Concrete			Prime Tek General Burnese	
Agod Concrete*		N/A	Prime Tek Blood Block	
Aged Concrete	N/A	Yes	Prime-Tek Bleed Block	
New Smooth BUR	N/A	Yes	Prime-Tek Bleed Block	
Aged Smooth BUR*	Prime-Tek Membrane Cleaner	Yes	Prime-Tek Bleed Block	
New APP	N/A	Yes	Prime-Tek Bleed Block	
Aged APP*	Prime-Tek Membrane Cleaner	Yes	Prime-Tek Bleed Block	
New SBS - Smooth	N/A	Yes	Prime-Tek Bleed Block	
Aged SBS - Smooth*	Prime-Tek Membrane Cleaner	Yes	Prime-Tek Bleed Block	
New SBS - Granulated	N/A	Yes	Prime-Tek Bleed Block	
Aged SBS - Granulated*	N/A	Yes	Prime-Tek Bleed Block	
New SPF	N/A	No	**	
Repair SPF*	N/A	No	Prime-Tek General Purpose	
Aged Silicone*	N/A	Yes	N/A	
Aged Acrylic*	N/A	Yes	N/A	

*- Field adhesion test required (2.0pli minimum) **- Use General Purpose or Tie-In Primer between day-to-day applications or if SPF will not be coated within 24 hrs.



SeamlesSEAL Acrylic					
		Pressure			
Roof Surface	Cleaner	Wash	Primer		
New EPDM	Prime-Tek Membrane Cleaner	Yes	N/A		
Aged EPDM*	Prime-Tek Membrane Cleaner	Yes	N/A		
New TPO	N/A	N/A	Prime-Tek TPO		
Aged TPO*	Prime-Tek Membrane Cleaner	Yes	Prime-Tek TPO		
New PVC/KEE					
Aged PVC/KEE*	Prime-Tek Membrane Cleaner	Yes	Prime-Tek Bleed Block		
Hypalon [®] *	Prime-Tek Membrane Cleaner	Yes	N/A		
New Ferrous Metal,					
Galvanized, or					
Galvalume finished	N/A	Yes	N/A		
Aged Ferrous Metal,					
Galvanized, or	N/A	Vee	Drives Tak Black Black		
Galvalume finished*	N/A	Yes			
New Concrete	N/A	N/A	Prime-Tek General Purpose		
Aged Concrete*	N/A	Yes	Prime-Tek Bleed Block		
New Smooth BUR	N/A	Yes	Prime-Tek Bleed Block		
Aged Smooth BUR*	Prime-Tek Membrane Cleaner	Yes	Prime-Tek Bleed Block		
New APP	N/A	Yes	Prime-Tek Bleed Block		
Aged APP*	N/A	Yes	Prime-Tek Bleed Block		
New SBS - Smooth	N/A	Yes	Prime-Tek Bleed Block		
Aged SBS - Smooth*	N/A	Yes	Prime-Tek Bleed Block		
New SBS - Granulated	N/A	Yes	Prime-Tek Bleed Block		
Aged SBS - Granulated*	N/A	Yes	Prime-Tek Bleed Block		
New SPF	N/A	No	**		
Repair SPF*	N/A	No	Prime-Tek General Purpose		
Aged Acrylic*	N/A	Yes	N/A		

*- Field adhesion test required (2.0pli minimum)

**- Use General Purpose or Tie-In Primer between day-to-day applications or if SPF will not be coated within 24 hrs.

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Equipment Shut Down and Roof Clean Up

October 2019

The information contained in this supplement serves as a criteria for Specifiers and Authorized Applicators regarding the design and installation of Carlisle Roof Foam and Coatings (CRFC) roofing systems and related products. Additional information essential for the design and installation of the Roof Systems are also included in the respective Specification for each Roof System and in the Design Reference Section of as well as the applicable Spec Supplement.

A. Equipment shutdown

- 1. Before shutting down gun, place unit in park, spray off target to relieve pressure.
- 2. Place gun in "safe" mode.
- 3. Turn off "A" and "B" manual valves, air supply and "A" and "B" material valves.
- 4. Place unit in "Park" position, the primary heater and heated hose assembly can be left "ON".
- 5. Turn off "A" and "B" primary heaters but leave heated hose "ON".

Type of Shutdown



Location	Short term break	End of Day	End of Job
At the proportioner	Bleed pressure	Bleed pressure	Bleed Pressure
	Park A side	Park A side	Park A side
	Material pressure relief valves	Material pressure relief valves	Material pressure relief valves
	Turn off /down primary heaters	Turn off primary heaters	Turn off primary heaters
		Shut material supply	Shut material supply
	valves Turn off air to gun	valves	valves
		off air to gun	air to gun
At the gun	Engage safety	Engage safety	Engage safety
	Turn off material valves	Turn off material valves	Turn off material valves
Transfer	Disconnect air hose or	Disconnect air hose or	Disconnect air hose or turn
pumps	turn off valve	turn off valve	off valve
Hoses		Coil and put on rack in rig	Coil and put on rack in rig
Air compressor		Turn off	Turn off
Air Dryer (if present)		Turn off	Turn off
Generator		Turn off	Turn off
Roof / Other		Double check that roof is watertight	Remove plugs from roof drains
		Remove plugs from roof drains	Remove all debris Complete daily paperwork
		Secure equipment against weather	,,,
		Remove bags/buns of test foam	
		Complete daily paperwork	

B. Job site precautions



- 1. Adjustments to production equipment should be the same as "End of day shutdown"
- 2. All power should be shut off to SPF production equipment.
- 3. Consider rolling the hose back up to keep the hose out of harm's way.
- 4. The security of the work area must be maintained equipment areas should be marked and masked off. Locking up tools and equipment is a must.
- 5. A sheet with emergency numbers of the crew should be posted.
- 6. It should be clear that no one enters the job site until the crew returns.

C. CLEAN UP

- 1. Walk the site and make sure everything is picked up, put away and secured.
- 2. Account for all workers and record the days activities.
- 3. Perform required maintenance.
- 4. Open up plugged roof drains.
- 5. Make sure roof is in watertight condition before leaving.
- 6. Take empty containers off site to properly dispose of completing the proper paperwork before transporting.
- 7. Tie down or secure items that could move due to inclement weather or high winds.
- 8. Check areas for large masses of foam either in bags or on scrap materials
 - a. If found break up to dissipate heat.
- 9. Properly coil up and secure hoses.
- 10. Complete the necessary paperwork for record keeping.

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- A. Walkways Options:
 - 1. Secondary roof coating of different color with embedded granules.
 - 2. Factory-made breathable walkways as approved by CRFC.
- B. Walkways Limitations & Cautions:
 - 1. Factory-made walkways are considered a maintenance items and are excluded from the CRFC warranty. Secondary roof coating as a walkway is included in CRFC's warranty.
 - 2. Window washing equipment will require special maintenance. Runways or window washing tracks must be segregated and separately constructed, with approved roofing or waterproofing system. It is required to prevent damage to all roof sections. Such details must be reviewed by CRFC to determine reasonable access to the membrane and associated insulation/underlayment components.
 - 3. Designer must follow Occupational Safety and Health Administration (OSHA) recommendations to allocate the locations of walkway.
- C. Scope of Work:
 - 1. Walkways are to be specified at all traffic concentration points (i.e., roof hatches, access doors, rooftop ladders, etc.), and if regular maintenance (once a month or more) is necessary to service rooftop equipment. PremiR+ 60 and PremiSEAL 60 or 70 are the recommended SPF products for use.
 - 2. Where applicable, a weather-resistant, breathable, resilient pad composed of synthetic rubber strands or other suitable material shall be installed to create protected surface over the SPF and coating system. Walkway shall consist of a different color to provide



contrast against coated surface. CRFC may be contacted for a list of walkways acceptable for use.

3. As an option, a walkway system can be formed by an additional layer of spray coating and granules. A contrasting color to the coating shall be selected so that the walkway system can easily be identified. Installation details attached at the end of this section shall be referenced, F-25.

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ROOF LADDER

PROPOSED PATH OF TRAVEL-VERIFY WITH OWNER

Gary and Mary West Wellness Center 7B Supplemental Flooring Owner's Specifications

Flooring Replacement

These specifications serve as a project specific supplement to Armstrong Flooring Installation Guide for Resilient Flooring June 2021 Manufacturer's recommended installation procedures will become the basis for accepting or rejecting actual installation procedures.

Submittals

Contractor shall submit to the building owner's representative 7 days prior to time of bid:

A. Any proposed product substitutions with substantiation of product equivalency in quality, durability and warranty offered.

Contractor shall submit to the building owner's representative prior to beginning work:

A. Shop drawings as applicable.

Existing Conditions:

EXAMINATION

Inspect existing surfaces to ensure that they are clean, smooth, sound, properly prepared, and free of moisture, dirt, debris, or other contamination.

PREPARATION

- A. Remove and dispose of existing flooring materials.
- B. All subsurfaces for flooring must be clean, sound, dry and free of any dirt, grease, oil, debris or other contaminants that may interfere with proper adhesion.
- C. In renovation or remodel work, remove any existing adhesive residue* so that 100% of the overall area of the original substrate is exposed.
- D. Prepare moisture testing to determine suitability for flooring. Apply floor sealer per manufacturer's recommendations based on test results.f. Before installation of the finished flooring, moisture, alkali and bond testing must be conducted. 1) Moisture testing must be performed in accordance with the current edition of ASTM F2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes (preferred method) or in accordance with the current edition of ASTM F1869 Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride. See Section E-10, Moisture Testing for more details.
- E. Always protect flooring from rolling loads from other trades and replacement and/or movement of appliances.
- F. Radiant heated substrates must not exceed a maximum surface temperature of 85° F (29° C).

G. As with many flooring products, the full spread adhesive methods generally require somewhat more attention to the condition of the substrate so that it will not telegraph irregularities through the finished floor.

APPLICATION

Per Manufacturer's Recommendations

- A. Patch, skim coat, infill and level subflooring. Repair and minimize small voids to prepare for smooth and level surface.
- B. Use of the Armstrong Flooring S-135 VapArrest Professional Moisture Retardant System: If the concrete slab does not meet the water vapor emission rate, ToughGuard II materials can be installed by the modified loose lay method over the S-135 VapArrest Professional Moisture Retardant System. The VapArrest must be allowed to cure for a minimum of 3 days until tack-free. Use double-faced acrylic tape for the modified installation method. For concrete subfloors, the percent relative humidity must be 80% or less as determined by test method ASTM F2170. If subfloor internal relative humidity levels exceed the recommended limit, the concrete must be allowed to dry prior to installing the floor.

PRODUCTS

See Section 7B4 Flooring Finish Schedule

SAFETY

Follow all Manufacturer's Safety Data Sheet

C. CLEAN UP

- 1. Walk the site and make sure everything is picked up, put away and secured.
- 2. Dispose of trash offsite.
- 3. Touch up paint on walls, doors and other surfaces damaged due to work.

3.07 Polishing and Finishing

All new floors to be sealed and buffed according to manufacturer's recommendations.

- A. Use Armstrong® S-495 Commercial Floor Sealer per use instructions. Provides an excellent base for S-480 or other commercial floor polishes. Coverage 1,500 to 2,000 sq. ft per gallon per coat.
- B. Use Armstrong S-480 Commercial floor polish per manufacturer's instructions.
- C. Newly installed commercial flooring should not be exposed to routine rolling load traffic (carts, lifters, etc.) for at least 72 hours after installation to allow setting and drying of adhesives. If rolling loads cannot be avoided, protect the newly installed commercial flooring for 72 hours after installation by covering with wood panels.



Guide Specification Standard Excelon[®] Tile Class 2 - Through-Pattern Vinyl Composition Tile Flooring

Standard Excelon® : Imperial® Texture

Resilient Flooring Specification

SECTION 09 65 19.19 Resilient Tile Flooring Created August 2020

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Flooring and accessories as shown on the drawings and schedules and as indicated by the requirements of this section.
- B. Related Documents
 - 1. Drawings and General Provisions of the Contract (including General and Supplementary Conditions and Division 1 sections) apply to the work of this section.

1.02 REFERENCES

- A. Armstrong Flooring Technical Manuals
 - 1. Armstrong Flooring Guaranteed Installation Systems manual, F-5061
 - 2. <u>Armstrong Flooring Maintenance Recommendations and Procedures, manual, F-8663</u>
- B. ASTM International:
 - 1. ASTM E 648 Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source
 - 2. ASTM E 662 Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials
 - 3. ASTM F 710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring
 - 4. ASTM F 1066 Standard Specification for Vinyl Composition Tile
 - 5. ASTM F 1482, Standard Guide to Wood Underlayment Products Available for Use Under Resilient Flooring
 - 6. ASTM F 1861 Standard Specification for Resilient Wall Base
 - 7. ASTM F 1869 Standard Test Method for Measuring Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
 - 8. ASTM F 2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes

- C. National Fire Protection Association (NFPA):
 - 1. NFPA 253 Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source
 - NFPA 258 Standard Test Method for Measuring the Smoke Generated by Solid Materials
- D. Canadian Standards
 - 1. CAN/ULC-S102.2 Surface Burning Characteristics of Flooring, Floor Covering and Miscellaneous Materials and Assemblies

1.03 SYSTEM DESCRIPTION

- A. Performance Requirements: Provide flooring which has been manufactured, fabricated and installed to performance criteria certified by manufacturer without defects, damage, or failure.
- B. Administrative Requirements
 - 1. Pre-installation Meeting: Conduct an on-site pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions and manufacturer's warranty requirements. Comply with Division 1 Project Management and Coordination (Project Meetings) Section.
 - 2. Pre-installation Testing: Conduct pre-installation testing as follows: [Specify testing (i.e. moisture tests, bond test, pH test, etc)
- C. Test Installations/ Mock-ups: Install at the project site a job mock-up using acceptable products and manufacturer approved installation methods, including concrete substrate testing. Obtain Owner's and Consultant's acceptance of finish color, texture and pattern, and workmanship standards.
 - 1. Mock-Up Size: 6' x 6'
 - 2. Maintenance: Maintain mock-up during construction for workmanship comparison; remove and legally dispose of mock-up when no longer required.
 - 3. Incorporation: Mock-up may be incorporated into the final construction with Owner's approval.
- D. Sequencing and Scheduling
 - 1. Install flooring and accessories after the other finishing operations, including painting, have been completed. Close spaces to traffic during the installation of the flooring.
 - 2. Do not install flooring over concrete slabs until they are sufficiently dry to achieve a bond with the adhesive, in accordance with the manufacturer's recommended bond, moisture tests and pH test.

1.04 SUBMITTALS

- A. Submit shop drawings, seaming plan, coving details, and manufacturer's technical data, installation and maintenance instructions (latest edition of <u>Armstrong Flooring Guaranteed</u> <u>Installation Systems</u> manual, F-5061) for flooring and accessories.
- B. Submit the manufacturer's standard samples showing the required colors for flooring and applicable accessories.
- C. Submit Safety Data Sheets (SDS) available for adhesives, moisture mitigation systems, primers, patching/leveling compounds, floor finishes (polishes) and cleaning agents and Material Information Sheets for flooring products.
- D. If required, submit the manufacturer's certification that the flooring has been tested by an independent laboratory and complies with the required fire tests.
- E. Closeout Submittals: Submit the following:
 - 1. Operation and Maintenance Data: Operation and maintenance data for installed products in accordance with Division 1 Closeout Submittals (Maintenance Data and

Operation Data) Section. Include methods for maintaining installed products, and precautions against cleaning materials and methods detrimental to finishes and performance.

2. Warranty: Warranty documents specified herein

1.05 QUALITY ASSURANCE

- A. Single-Source Responsibility: provide types of flooring and accessories supplied by one manufacturer, including moisture mitigation systems, primers, leveling and patching compounds, and adhesives.
- B. Select an installer who is experienced and competent in the installation of Armstrong resilient vinyl composition tile flooring and the use of Armstrong Flooring subfloor preparation products.
 - 1. Engage installers certified as Armstrong Commercial Flooring Certified Installers
 - 2. Confirm installer's certification by requesting their credentials
- C. Fire Performance Characteristics: Provide resilient vinyl composition tile flooring with the following fire performance characteristics as determined by testing material in accordance with ASTM test methods indicated below by a certified testing laboratory or other testing agency acceptable to authorities having jurisdiction:
 - 1. ASTM E 648 Critical Radiant Flux of 0.45 watts per sq. cm. or greater, Class I
 - 2. ASTM E 662 (Smoke Generation) Maximum Specific Optical Density of 450 or less
 - CAN/ULC-S102.2 Flame Spread Rating and Smoke Developed Results as tested.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Comply with Division 1 Product Requirements Sections
- B. Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
- C. Deliver materials in good condition to the jobsite in the manufacturer's original unopened containers that bear the name and brand of the manufacturer, project identification, and shipping and handling instructions.
- D. Store materials in a clean, dry, enclosed space off the ground, protected from harmful weather conditions and at temperature and humidity conditions recommended by the manufacturer. Protect adhesives from freezing. Store flooring, adhesives and accessories in the spaces where they will be installed for at least 48 hours before beginning installation.

1.07 PROJECT CONDITIONS

A. Maintain a minimum temperature in the spaces to receive the flooring and accessories of 65°F (18°C) and a maximum temperature of [100°F (38°C)][85°F (29°C)] for at least 48 hours before, during, and for not less than 48 hours after installation. Thereafter, maintain a minimum temperature of 55°F (13°C) in areas where work is completed. Protect all materials from the direct flow of heat from hot-air registers, radiators, or other heating fixtures and appliances. Refer to the <u>Armstrong Flooring Guaranteed Installations Systems</u> manual, F-5061 for a complete guide on project conditions.

1.08 LIMITED WARRANTY

- A. Resilient Flooring: Submit a written warranty executed by the manufacturer, agreeing to repair or replace resilient flooring that fails within the warranty period.
- B. Limited Warranty Period: 5 years
- C. Limited Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.
- D. For the Limited Warranty to be valid, this product is required to be installed using the appropriate Armstrong Flooring Guaranteed Installation System. Product installed not using the specific instructions from the Guaranteed Installation System will void the warranty.

.09 EXTENDED SYSTEM LIMITED WARRANTY

- A. Resilient Flooring System: Submit a written warranty executed by the manufacturer, agreeing to repair or replace system (subfloor preparation products, adhesive, and floor covering) that fails within the warranty period.
- B. Limited Warranty Period: 10 years on top of the Resilient Flooring Limited Warranty
- C. [S-453 Level Strong[™] cement based self-leveling compound] [S-456 Patch Strong[™] flexible patching and smoothing compound] [S-454 Prime Strong[™] acrylic primer for porous substrates] [S-455 Prime Strong[™] acrylic primer for non-porous substrates] [S-452 Seal Strong[™] two part moisture mitigation system]
- D. The installation of an Armstrong Flooring product along with the recommended Armstrong Flooring adhesive, as well as any one of the Strong System subfloor preparation products listed above, provides 10 additional years of limited warranty coverage. The Strong System limited warranty covers the installation integrity for the length of the flooring product warranty plus 10 years. In order to qualify for the Strong System Warranty, any subfloor preparation product needed for an installation must be an Armstrong Flooring product.
- E. For the System Limited Warranty to be valid, this product is required to be installed using the appropriate Armstrong Flooring Guaranteed Installation System. Product installed not using the specific instructions from the Guaranteed Installation System will void the warranty.
- F. When Armstrong Flooring Strong System subfloor preparation products are used with other manufacturers' floor coverings, adhesives, or other subfloor preparation products, Armstrong Flooring warrants our products to be free from manufacturing defects from the date of purchase through the limited warranty period of 15 years.

1.10 MAINTENANCE

- A. Extra Materials: Deliver extra materials to Owner. Furnish extra materials from same production run as products installed. Packaged with protective covering for storage and identified with appropriate labels.
 - 1. Quantity: Furnish quantity of flooring units equal to 5 % of amount installed.
 - 2. Delivery, Storage and Protection: Comply with Owner's requirements for delivery, storage and protection of extra material.

PART 2 - PRODUCTS

2.01 MANUFACTURER

A. Resilient tile flooring, wall base, adhesives and subfloor preparation products and accessories:

Armstrong Flooring Inc., 2500 Columbia Avenue, Lancaster, PA 17604, www.armstrongflooring.com/commercial

OR EQUAL

1. Manufacturer must have a headquarters in the United States of America

2.02 RESILIENT TILE FLOORING MATERIALS

- A. Provide Vinyl Composition Tile: Standard Excelon® [Imperial® Texture][Multicolor™] Tile Flooring manufactured by Armstrong Flooring, Inc.or equal
 - 1. Description: Tile composed of polyvinyl chloride resin, plasticizers, fillers, stabilizers and pigments with colors and texture dispersed uniformly throughout its entire thickness.
 - 2. Vinyl composition tile shall conform to the requirements of ASTM F 1066, "Standard Specification Vinyl Composition Floor Tile", Class 2, through-pattern
 - 3. Pattern and Color: in [%COLOR%] [color selected from the range currently available from Armstrong Flooring, Inc.]
 - 4. Size: 12 in. x 12 in. (305 mm x 305 mm)
 - 5. Thickness: [1/8"/0.125 in. (3.2mm)] [3/32"/0.095 in. (2.4mm)]

2.03 PRODUCT SUBSTITUTION

A. Substitutions: Substitutions must be submitted and accepted seven days prior to bid submittal.

2.05 ADHESIVES

- A. For Tile Installation System, Full Spread: Provide Armstrong [S-515 Floor Tile Adhesive] [S-525 BBT® Bio-Flooring Adhesive] [S-700 Floor Tile Adhesive Thin Spread] [S-750 Premium Floor Tile Adhesive] under the tile and Armstrong S-725 Wall Base Adhesive at the wall base as recommended by the flooring manufacturer.
- B. [For Tile Installation System, Tile On: Provide Armstrong [S-515 Floor Tile Adhesive] [S-525 BBT® Bio-Flooring Adhesive] [S-750 Floor Tile Adhesive Thin Spread] under the tile over smooth, completely bonded existing resilient flooring and Armstrong S-725 Wall Base Adhesive at the wall base as recommended by the flooring manufacturer].
- C. [For Tile High-Moisture Installation Warranty, Full Spread: Provide Armstrong [S-515 Floor Tile Adhesive] [S-525 BBT® Bio-Flooring Adhesive] under the tile and Armstrong S-725 Wall Base Adhesive at the wall base as recommended by the flooring manufacturer].

2.06 ACCESSORIES

- A. For patching, smoothing, and leveling monolithic subfloors (concrete, terrazzo, quarry tile, ceramic tile, and certain metals), provide Armstrong [S-184 Fast-Setting Cement-Based Patch and Underlayment] [S-194 Cement-Based Patch, Underlayment and Embossing Leveler / S-195 Underlayment Additive] [S-453 Level Strong[™] cement based self-leveling compound] [S-456 Patch Strong[™] flexible patching and smoothing compound].
- B. [For priming porous substrates to aid in adhesive bond strength and reducing subfloor porosity, provide S-454 Prime Strong[™] acrylic primer for porous substrates. For non-porous substrates, provide S-455 Prime Strong[™] acrylic primer for non-porous substrates].

- C. [For creating a moisture barrier, provide S-452 Seal Strong[™] two part moisture mitigation system].
- D. For sealing joints between the top of wall base or integral cove cap and irregular wall surfaces such as masonry, provide plastic filler applied according to the manufacturer's recommendations.
- E. Provide transition/reducing strips tapered to meet abutting materials.
- F. Provide minimal threshold of thickness and width.
- G. Provide resilient edge strips of width shown on the drawings, of equal gauge to the flooring, homogeneous vinyl or rubber composition, tapered or bullnose edge, with color to match or contrast with the flooring, or as selected by the Architect from standard colors available.
- H. Provide metal edge strips of width shown on the drawings and of required thickness to protect exposed edges of the flooring. Provide units of maximum available length to minimize the number of joints. Use butt-type metal edge strips for concealed anchorage, or overlap-type metal edge strips for exposed anchorage. Unless otherwise shown, provide strips made of extruded aluminum with a mill finish.

PART 3 - EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS

A. Compliance: Comply with manufacturer's product data, including technical bulletins, product catalog, installation instructions, and product carton instructions for installation and maintenance procedures as needed.

3.02 EXAMINATION

- A. Site Verification of Conditions: Verify substrate conditions (which have been previously installed under other sections) are acceptable for product installation in accordance with manufacturer's instructions (i.e. moisture tests, bond test, pH test, etc.).
- B. Visually inspect flooring materials, adhesives and accessories prior to installation. Flooring material with visual defects shall not be installed and shall not be considered as a legitimate claim.
- C. Examine subfloors prior to installation to determine that surfaces are smooth and free from cracks, holes, ridges, and other defects that might prevent adhesive bond or impair durability or appearance of the flooring material.
- D. Inspect subfloors prior to installation to determine that surfaces are free from curing, sealing, parting and hardening compounds; residual adhesives; adhesive removers; and other foreign materials that might prevent adhesive bond. Visually inspect for evidence of moisture, alkaline salts, carbonation, dusting, mold, or mildew.
- E. Report conditions contrary to contract requirements that would prevent a proper installation. Do not proceed with the installation until unsatisfactory conditions have been corrected.
- F. Failure to call attention to defects or imperfections will be construed as acceptance and approval of the subfloor. Installation indicates acceptance of substrates with regard to conditions existing at the time of installation.

3.03 PREPARATION

A. [Subfloor Preparation: Smooth concrete surfaces, removing rough areas, projections, ridges, and bumps, and filling low spots, control or construction joints, and other defects with

Armstrong Flooring [S-184 Fast-Setting Cement-Based Patch and Underlayment][S-194 Cement-Based Patch, Underlayment and Embossing Leveler / S-195 Underlayment Additive] [S-453 Level Strong[™] cement based self-leveling compound] [S-456 Patch Strong[™] flexible patching and smoothing compound] [S-454 Prime Strong[™] acrylic primer for porous substrates] [S-455 Prime Strong[™] acrylic primer for non-porous substrates] as recommended by the flooring manufacturer. Refer to <u>Armstrong Flooring Guaranteed</u> <u>Installation Systems</u> manual, F-5061 and ASTM F 710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring for additional information on subfloor preparation.]

- B. [Subfloor Preparation Moisture Mitigation: Smooth concrete surfaces, removing rough areas, projections, ridges, and bumps, and filling low spots, control or construction joints, mitigate moisture and other defects with Armstrong Flooring [S-184 Fast-Setting Cement-Based Patch and Underlayment][S-194 Cement-Based Patch, Underlayment and Embossing Leveler / S-195 Underlayment Additive] [S-453 Level Strong™ cement based self-leveling compound] [S-456 Patch Strong™ flexible patching and smoothing compound] [S-452 Seal Strong™ two part moisture mitigation system] [S-454 Prime Strong™ acrylic primer for porous substrates] [S-455 Prime Strong™ acrylic primer for non-porous substrates] as recommended by the flooring manufacturer. Refer to Armstrong Flooring Guaranteed Installation Systems manual, F-5061 and ASTM F 710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring for additional information on subfloor preparation.]
- C. Subfloor Cleaning: The surface shall be free of dust, solvents, varnish, paint, wax, oil, grease, sealers, release agents, curing compounds, residual adhesive, adhesive removers and other foreign materials that might affect the adhesion of resilient flooring to the concrete or cause a discoloration of the flooring from below. Remove residual adhesives as recommended by the flooring manufacturer. Remove curing and hardening compounds not compatible with the adhesives used, as indicated by a bond test or by the compound manufacturer's recommendations for flooring. Avoid organic solvents. Spray paints, permanent markers and other indelible ink markers must not be used to write on the back of the flooring material or used to mark the concrete slab as they could bleed through, telegraphing up to the surface and permanently staining the flooring material. If these contaminants are present on the substrate they must be mechanically removed prior to the installation of the flooring material... Refer to the <u>Armstrong Flooring Guaranteed Installation Systems</u> manual, F-5061 and ASTM F 710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring for additional information on subfloor preparation.
- D. For Tile Installation System, Full Spread when using S-700 or S-750 adhesive, perform subfloor moisture testing in accordance with [ASTM F 2170, "Standard Test Method for Determining Relative Humidity in Concrete Slabs Using *in-situ* Probes"][ASTM F 1869,Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride] and Bond Tests as described in the <u>Armstrong Flooring Guaranteed Installation Systems</u> manual, F-5061, to determine if surfaces are dry; free of curing and hardening compounds, old adhesive, and other coatings; and ready to receive flooring. [Relative humidity shall not exceed 80%.][MVER shall not exceed 5 lbs./1000 sq. ft./24 hrs.] On installations where both the Percent Relative Humidity and the Moisture Vapor Emission Rate tests are conducted, results for both tests shall comply with the allowable limits listed above. Do not proceed with flooring installation until results of moisture tests are acceptable. All test results shall be documented and retained]
- E. [For Tile High-Moisture Installation Warranty when using S-515 Adhesive, perform subfloor moisture testing in accordance with [ASTM F 2170, "Standard Test Method for Determining Relative Humidity in Concrete Slabs Using *in-situ* Probes"][ASTM F 1869, "Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride"] and Bond Tests as described in the <u>Armstrong Flooring Guaranteed Installation Systems</u> manual, F-5061, to determine if surfaces are dry; free of curing and hardening compounds, old adhesive, and other coatings; and ready to receive flooring. [Relative humidity shall not exceed 95%.][MVER shall not exceed 7 lbs./1000 sq. ft./24 hrs.]

On installations where both the Percent Relative Humidity and the Moisture Vapor Emission Rate tests are conducted, results for both tests shall comply with the allowable limits listed above. Do not proceed with flooring installation until results of moisture tests are acceptable. All test results shall be documented and retained].

- F. [For Tile High-Moisture Installation Warranty when using S-525 Adhesive, perform subfloor moisture testing in accordance with [ASTM F 2170, "Standard Test Method for Determining Relative Humidity in Concrete Slabs Using *in-situ* Probes"][ASTM F 1869, "Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride"] and Bond Tests as described in the <u>Armstrong Flooring Guaranteed Installation Systems</u> manual, F-5061, to determine if surfaces are dry; free of curing and hardening compounds, old adhesive, and other coatings; and ready to receive flooring. [Relative humidity shall not exceed 90%.][MVER shall not exceed 7 lbs./1000 sq. ft./24 hrs.] On installations where both the Percent Relative Humidity and the Moisture Vapor Emission Rate tests are conducted, results for both tests shall comply with the allowable limits listed above. Do not proceed with flooring installation until results of moisture tests are acceptable. All test results shall be documented and retained.
- G. Concrete pH Testing: Perform pH tests on concrete floors regardless of their age or grade level. All test results shall be documented and retained.
- H. Wood subfloors: Armstrong resilient floors are recommended on suspended wood subfloors with a 1/4" underlayment (see product installation systems for exceptions) and a minimum of 18" of well-ventilated air space below. Armstrong Flooring does not recommend installing resilient flooring on wood subfloors applied directly over concrete or on sleeper-construction subfloors. Loading requirements for subfloors are normally set by various building codes on both local and national levels. Trade associations such as APA–The Engineered Wood Association provide structural guidelines for meeting various code requirements. Subfloor panels are commonly marked with span ratings showing the maximum center-to-center spacing in inches of supports over which the panels should be placed.
 - Refer to the <u>Armstrong Flooring Guaranteed Installation Systems</u> manual, F-5061 and ASTM F 1482, Standard Guide to Wood Underlayment Products Available for Use Under Resilient Flooring for additional information.
- I. Wood subfloors Surface Cleaning: Make subfloor free from dust, dirt, grease, and all foreign materials.
 - Check panels for sources of discoloration such as contamination from paint, varnish, stain overspray or spills, plumbing sealers, asphalt, heater fuel, markers or potential staining agents such as wood or bark not visible on the surface, edge sealers, logo markings, printed nail patterns and synthetic patches.
 - 2. Remove old adhesive.
 - 3. Cover adhesive, oil or wax residue with an appropriate underlayment. If the residue is tacky, place a layer of felt or polyethylene sheeting over it to prevent a cracking sound when walking on the floor.
 - 4. Remove all paint, varnish, oil and wax from all subfloors. Many buildings constructed before 1978 contain lead-based paint, which can pose a health hazard if not handled properly. State and federal regulations govern activities that disturb lead-based painted surfaces and may also require notice to building occupants. Do not remove or sand lead-based paint without consulting a qualified lead professional for guidance on lead-based paint testing and safety precautions. Armstrong Flooring does not recommend the use of solvents to remove paint, varnish, oil, wax or old adhesive residues because the solvents can remain in the subfloor and negatively affect the new installation. Whenever sanding, be certain the work site is well ventilated and avoid breathing dust. If high dust levels are anticipated, use appropriate National Institute for Occupational Safety and Health (NIOSH)

designated dust respirator. All power sanding tools must be equipped with dust collectors. Avoid contact with skin or eyes. Wear gloves, eye protection and long-sleeve, loose fitting clothes

- For additional information on the installation and preparation of wood and boardtype underlayments see the current edition of ASTM F1482, "Standard Practice for Installation and Preparation of Panel Type Underlayments to Receive Resilient Flooring."
- 6. Vacuum or broom-clean surfaces to be covered immediately before the application of flooring.

3.04 INSTALLATION OF FLOORING

- A. Install flooring in strict accordance with the latest edition of <u>Armstrong Flooring Guaranteed</u> <u>Installation Systems</u> manual, F-5061. Failure to comply may result in voiding the manufacturer's warranty listed in Section 1.08.
- B. Install flooring wall to wall before the installation of floor-set cabinets, casework, furniture, equipment, movable partitions, etc. Extend flooring into toe spaces, door recesses, closets, and similar openings as shown on the drawings.
- C. If required, install flooring on pan-type floor access covers. Maintain continuity of color and pattern within pieces of flooring installed on these covers. Adhere flooring to the subfloor around covers and to covers.
- D. Scribe, cut, and fit to permanent fixtures, columns, walls, partitions, pipes, outlets, and builtin furniture and cabinets.
- E. Install flooring with adhesives, tools, and procedures in strict accordance with the manufacturer's written instructions. Observe the recommended adhesive trowel notching, open times, and working times.

3.05 INSTALLATION OF ACCESSORIES

- A. Apply top set wall base to walls, columns, casework, and other permanent fixtures in areas where top-set base is required. Install base in lengths as long as practical, with inside corners fabricated from base materials that are mitered or coped. Tightly bond base to vertical substrate with continuous contact at horizontal and vertical surfaces.
- B. Fill voids with plastic filler along the top edge of the resilient wall base or integral cove cap on masonry surfaces or other similar irregular substrates.
- C. Place resilient edge strips tightly butted to flooring, and secure with adhesive recommended by the edge strip manufacturer. Install edge strips at edges of flooring that would otherwise be exposed.
- D. Apply [butt-type] [overlap] metal edge strips where shown on the drawings, [before] [after] flooring installation. Secure units to the substrate, complying with the edge strip manufacturer's recommendations.

3.06 CLEANING

A. Perform initial and on-going maintenance according to the latest edition of <u>the maintenance</u> <u>recommendations for Standard Excelon Imperial Texture</u>.

3.07 PROTECTION
A. Protect installed flooring as recommended by the flooring manufacturer against damage from rolling loads, other trades, or the placement of fixtures and furnishings. (See Finishing The Job in the latest edition of <u>Armstrong Flooring Guaranteed Installation Systems</u> manual, F-5061.)

END OF SECTION

ROPPE.

Wall Base

INSTALLATION INSTRUCTIONS

This document is intended to cover substrate preparation requirements and installation instructions for all Wall Base concepts for Roppe including rubber, TPR rubber, vinyl and sculpted formats. If there are any questions or concerns, please reach out to <u>solutions@rhctechnical.com</u>.

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Recommended Adhesive Coverage Rates and Maintenance Limits after Installation*							
Adhesive	Unit	Base Sizes	Porous	Non-Porous	Maintenance		
WB-600	Cartridge	2.5" - 3.5" 70 lin. ft. N/A		N/A	72 Hours		
WB-600	Cartridge	3.5" - 6"	50 lin. ft.	N/A	I/A 72 Hours		
WB-600	Cartridge	6.5" +	30 lin. ft.	N/A	72 Hours		
WB-600	4 Gallon	2.5" - 3.5"	340 lin. ft.**	N/A	72 Hours		
WB-600	4 Gallon	3.5" - 6"	240 lin. ft.** N/A		72 Hours		
WB-600	4 Gallon	6.5" +	180 lin. ft.** N/A 72 Hou		72 Hours		
C-630	Quart	2.5" - 3.5"	100 lin. ft. 24 Hours		24 Hours		
C-630	Quart	3.5" - 6"	130 lin. ft. 24 Hours		24 Hours		
C-630	Quart	6.5" +	160 lin. ft. 24 Hours		24 Hours		
*rates are approximate and subject to level of porosity as well as ambient conditions, actual values may vary							

**rates are per gallon unless otherwise specified

1. PRE-INSTALLATION

Prior to acceptance of this document refer to website <u>www.roppe.com</u> to confirm that you have the most current revision. Consult all associated product literature concerning adhesive installation, maintenance and warranty prior to installation of wall base. Allow all trades to complete work prior to installation when possible. Deliver all materials



to the installation location in its original packaging with labels intact. Do not stack pallets to avoid damage. Remove any plastic and strapping from packaging after delivery. Inspect all material for proper type, color and matching lot numbers if appropriate. Ensure that all adhesives intended for installation are approved for use with accessory material. Turn off radiant-heated flooring systems 48 hours prior to installation. 48 hours after installation, gradually increase the temperature over the course of 24 hours to a maximum temperature of 85°F (29.5° C). Do not proceed with installation until all conditions have been met.

1.1 STORAGE, ACCLIMATION & SERVICE ENVIRONMENT

Ensure material is adequately stored at temperatures between 65° F (19° C) and 85° F (30° C) prior to installation. This product is designed, manufactured and tested to perform at constant temperatures, not fluctuating more than 4° from normal selected service temperatures from the allowable 65° F (19° C) - 85° F (30° C) range.

During acclimation, the site must be fully enclosed, weather tight, and material must be in the installation area with the HVAC system functional and operating at desired service temperatures for a period of 48 hours prior to installation, during the installation and for the service life of the installation afterwards.

It is recommended to maintain an ambient relative humidity between 40% and 60% for a period of 48 hours prior to installation, during the installation and for the service life of the installation afterwards. If the material will be installed outside of the above acclimation and service temperature ranges contact Technical Services for more detailed installation recommendations. Do not proceed with installation until all conditions have been met.

1.2 PRODUCT LIMITATIONS

Do not install materials over existing wall base, rubber, vinyl or linoleum flash cove, cork, and asphaltic materials. Do not install wall base materials in outdoor areas and in or around commercial kitchens. Do not use wall base in place of crash guard/rail or wall protection where extreme abuse or high impact areas may occur. Damage will occur with repeated impact from pallet jacks, heavy carts, chair/furniture legs, forklifts or dollies. Do not allow product to be directly exposed to extreme heat sources, such as radiators, ovens or other high-heat equipment. Protect installation area from extreme temperature changes, such as excessive heat and freezing, as well as direct sunlight/UV for at least 48 hours before, during and for the life of the installation. Fading can occur from extensive or long term exposure to heavy direct or glass-filtered sunlight, or unfiltered ultra-violet rays, so use caution or window treatments in these areas. May be susceptible to staining from harsh disinfectants, cleaning agents, dyes or other harsh chemicals – ensure all chemicals and materials that may come in contact with wall base will not stain, mar or otherwise damage the material prior to use.

2. SUBSTRATE PREPARATION

In regards to substrate preparation when mechanical sanding, grinding, shot blasting and vacuuming always follow the Resilient Floor Covering Institute's (RFCI) "Recommended Work Practice for Removal of Existing Floor Covering and Adhesives", and all applicable local, state, federal and OSHA requirements in regards to Asbestos and Silica containment regulations.

All substrates must be clean, smooth, permanently dry, flat, and structurally sound. Substrates must be free of visible water or condensation, dust, sealers, water-based / acrylic paint, residual adhesives and adhesive removers, solvents, wax, oil, grease, asphalt, gypsum compounds, visible alkaline salts or excessive efflorescence, mold, mildew and any other extraneous coating, film, material or foreign matter. Substrate must be a structurally sound interior wall surface, such as dry plaster, cured drywall, fiber-reinforced plastic (FRP) panels, fiberglass, exterior grade plywood (Group 1, CC type), concrete, metal and masonry. Any cracks, voids, divots, grout lines and imperfections must be filled with a patch or filler suitable for the substrate. Gaps at the bottom of a wall shall not exceed 1/2" when installing a base with a toe and not exceed 1/4" with toeless base, although it is preferred to have substrate backing all the way to floor with toeless base.

When installing directly over a resinous products, such as epoxy paint, ensure that coating is dry to the touch and has cured for the prescribed length of time. Substrate must be clean, dry, sound and free of contaminates. Metal substrates must be thoroughly sanded/ground and cleaned of any residue, oil, rust and/or oxidation. Substrate must be smooth, flat and sound prior to installation. When installing in areas that may be subject to topical water or



moisture and/or high humidity, an anti-corrosive coating must be applied to protect metal substrate. Contact a local paint or coating supplier for coating recommendations.

2.1 POROUS SUBSTRATES

Porous substrates such as most concrete, wood, and unpainted drywall need to be clean, dust free and also free of all aforementioned contaminates.

2.2 NON-POROUS SUBSTRATES

Non-Porous substrates such as epoxy paint, FRP panels, fiberglass, or metal must be installed with the Excelsior C-630 Contact Adhesive. It is also recommended when installing over very smooth or glossy substrates such as FRP or metal, to abrade the substrate to improve the bond of the adhesive.

3. INSTALLATION

Prior to installation, ensure wall base material has been properly acclimated and that ambient conditions are within normal service ranges. Ensure substrate is suitably prepared prior to installation, as manufacturer is not responsible for substrates that have not been properly prepared. Ensure adhesive is approved for use with wall base material and that proper trowel or applicator type and size is used, as manufacturer is not responsible for any and all adhesion issues related to improper adhesive selection or usage.

3.1 TRADITIONAL COVE AND STRAIGHT WALL BASE

If using factory corners or corner blocks install those first prior to installing the selected wall base products. Refer to installation information below for the installation of those products.

Apply adhesive to the back of the wall base or wall surface per adhesive instructions, ensuring that wet-set adhesives do not come within 1/4" of the top of the wall base to prevent oozing. Install wall base to substrate, ensuring that wall base material is not stretched or over-compressed during installation. Stretching material or over-compressing seams and corners may cause wall base to shrink and/or curl/delaminate, respectively.

Periodically lift material to ensure proper adhesive transfer, adhesive should cover 90% of material when rolled into place. Using a suitable hand roller, carefully roll material in the direction of the last piece installed with a hand roller within 30 minutes of installation.

Wall Base and Corner Block Installations can be enhanced by using matching Colored Caulk to fill any voids or imperfections. Allow wall base to cure for the required period of time and do not disturb wall base installation until curing time is complete.

3.1.1 FACTORY CORNER OR CORNER BLOCK INSTALLATION

Factory Corners and Corner Blocks should be installed prior to Wall Base products.

Corners and corner blocks are designed for installation on standard 90° corners, installation should not be attempted on rounded corners other angles, including 135° angles. Install adhesive to the back of the corner or corner block and install onto corner. Mechanically fasten the returns / wings of corner blocks with staples or brad nails to increase stability. When fastening, ensure that staples or nail heads do not protrude from return, as they may telegraph through wall base material.

3.1.2 JOBSITE FORMED CORNER INSTALLATION

3.1.2.1 OUTSIDE CORNERS with COVE

To create an outside corner on-site using wall base material, position wall base material firmly against the wall, allowing wall base to overhang corner in the direction that it will be installed.

Wall Base

INSTALLATION INSTRUCTIONS

Use a pencil to mark the center of the corner on the back of the wall base, ensuring pencil line is straight and runs from the top of the wall base to the base of the toe. Reposition wall base material on a flat, stable surface, backside facing up.

Use a top-set gouge to create a center groove on the long side of the pencil line, removing ~30% of the wall base material. Ensure center groove is on the side of the line that is in the direction the wall base will be installed. Remove excess material from each side of the corner groove.

Use a pencil to mark 1" from the base of the toe on the center line. From the 1" mark, mark a straight line on a 45° angle to the base of the toe on either side of the center groove. Use the top-set gouge to cut two stress relief grooves along the pencil line. Use a knife to remove all excess material between the stress relief groove and the center groove.

Outside Corner Detail – Cove Only



While rolling to toe of the wall base up, fold wall base along center groove to form the corner. The top edge of the wall base should fit tight and flush to the wall's surface, while the toe should be rounded and sit flat on the surface of the floor.

Apply adhesive to the back of the wall base per adhesive instructions, ensuring that wet-set adhesives do not come within 1/4" of the top of the wall base, and install wall base to substrate.

3.1.2.2 INSIDE CORNERS with COVE

OPP

Proven Flooring Experiences

When creating an inside corner on-site using coved wall base material, position wall base product firmly against the wall and into the corner. Use a pencil to mark the center of the corner on the back of the wall base and make note of wall base installation direction (from left to right or right to left). Reposition wall base material on a flat, stable surface, backside facing up.

Prior to creating an inside corner, measure the distance from the end of the last piece of base installed to the inside corner. If the distance from the last piece of base installed and the corner is within 5', draw a center line 1/16" from initial center mark in the direction the wall base will be installed.

If the distance is more than 5', draw a center line 1/8" from initial center mark in the direction the wall base will be installed. Ensure pencil line is straight and runs from the top of the wall base to the base of the toe.

Use a top-set gauge to create a center groove along the center line, then remove excess material from each side of the center groove and fold wall base along center groove to form the inside corner.

Use a utility knife to cut a "V" into the toe from the base of the toe to the end of the toe. Ensure "V" is slightly less than 45° to avoid removing too much material. Remove material to create a triangular void so that wall base can be installed into corner without the toe overlapping. Make any final adjustments prior to installation.

Apply adhesive to the back of the wall base per adhesive instructions, ensuring that wet-set adhesives do not come within 1/4" of the top of the wall base, and install wall base to substrate.

The top edge of the wall base should fit tight and flush to the wall's surface and previously installed wall base.

Once properly positioned, apply firm pressure to the corner to adhere it to the wall. Roll wall base with a hand roller in the direction the material was installed.



3.1.2.3 INSIDE CORNERS with STRAIGHT

To create an inside corner on-site using wall base material, install one side of the inside corner as usual, ensuring that wall base is flush with adjoining wall.

Before applying adhesive, position the next section or coil of wall base on the adjoining wall with a \sim 1" gap from the installed material. Set a divider to the gap and move wall base material flush with the corner. While applying firm pressure to the adjacent wall base corner with divider, mark the wall base with the divider to determine scribe line.

Use a suitable knife to trim wall base along scribe mark. Install wall base as usual, ensuring that wet set adhesives do not come within 1/4" of the top of the wall base and do not squeeze out of wall base corner.

3.2 SCULPTED WALL BASE

Cut wall base to desired length and fit tightly against corner blocks (installation the same as above for traditional wall base) or allow for job-site formed corners detailed in a later section.

When installing base against corner block fixtures, a scribe tool may be needed. All corners may not be plum, scribing the base to the corner may be the best option for a tight fit. After scribing and when cutting the base material along the scribe line, give the cut a slight angle back so the front face of the material fits against the edge of the corner block. The face of the material can be kicked out when installed over the corner block wings. Any minor imperfections can be corrected with the use of the color match caulking.

Butting the ends of the base may require re-cutting. Under certain conditions the factory edges may not be square enough for an acceptable installation.

Another method that will help conceal the end seams is to install with a 22.5° or 45° overlap. It may also help to have to the angle of the overlap facing away from the main line of sight. The use of contact adhesive or liquid super glue can be used to bond the end seams.

Apply adhesive to the back of the wall base per adhesive instructions, ensuring that wet-set adhesives do not come within 1/4" of the top of the wall base. Install wall base to substrate, ensuring that wall base material is not stretched or over-compressed during installation. Stretching material or over-compressing seams and corners may cause wall base to shrink and/or curl/delaminate, respectively.

Periodically lift material to ensure proper adhesive transfer - adhesive should cover 90% of material. Using a suitable hand roller, carefully roll material in the direction of the last piece installed with a hand roller within 30 minutes of installation.

3.2.1 JOBSITE FORMED CORNERS

When using thick sculpted wall base, job-site formed corners are made similar to wood baseboard and wood molding. Use the Miter-Saw or D-Cut Mitering Methods for inside and outside corners. The use of the Coping Method is recommended for inside corners that are not square or plumb.

3.2.1.1 MITER-SAW MITERING METHOD

When using a miter-saw to cut sculptured wall base, be sure to use a finishing blade with a minimum of 60 teeth.

Ensure miter saw has a high enough fence and a long enough table to support material as it is being cut. Prior to cutting wall base, use an adjustable protractor or an angle finder to determine the angle of the corner to be formed. Adjust miter saw blade angle to measured angle and cut material to create an undercut angle.

When cutting material, be sure to move through material slowly enough to provide a clean cut but fast enough to avoid burning or deforming the material.



Pre-fit both pieces of the outside corner together and ensure a tight fit and make any minor adjustments as needed. After the corner is tight, use **Loctite Liquid Professional Super Glue** (or an equivalent, liquid super glue) to glue corner pieces together at the joint.

After the super glue has dried, apply adhesive to the back of the wall base per adhesive instructions, ensuring that wet-set adhesives do not come within 1/4" of the top of the wall base, and install corner to substrate.

3.2.1.2 D-CUT MITERING METHOD

When using a D-Cut RC-200 Wall Base Cutter, ensure blade is sharp, clean and does not have any chips or visible damage. Angles other than 90°, 45° or Square Cuts will need to be done with a miter saw.

Set D-Cut blade to a 45° angle and adjust forward or backward, depending on cut desired.

Use D-Cut cutter to cut outside corner edges of both pieces of corner material, ensuring that material is flush to D-Cut cutter fence and does not move or shift while cutting.

Pre-fit both pieces of the outside corner together to ensure a tight fit and make any minor adjustments as needed. After the corner is tight, use **Loctite Liquid Professional Super Glue** (or an equivalent, liquid super glue) to glue corner pieces together at the joint.

After the super glue has dried, apply adhesive to the back of the wall base per adhesive instructions, ensuring that wet-set adhesives do not come within 1/4" of the top of the wall base, and install corner to substrate.

3.2.1.3 COPING METHOD

Install one side of the inside corner as usual butting to the adjacent wall, ensuring base is flush against both surfaces. Cut the second piece at a 45° angle exposing the back side of the material using a Miter-Saw or a D-Cut cutter. This will reveal the face of the profile.

Using a Utility knife or Coping Saw cut the second piece carefully following the leading edge of the profile face. Be sure to taper or under-cut the back of the material when cutting. Once cutting is finalized, butt the second piece into the already installed first piece.

Make final adjustments as necessary and apply adhesive to the back of the wall base per adhesive instructions, ensuring that wet-set adhesives do not come within 1/4" of the top of the wall base, and install corner to substrate.

4. PAINTING PROCEDURES

Wall Base may be painted, if desired. Once wall base has been cleaned and wall base is free of all residues which may interfere with bonding, the wall base must be primed prior to final painting. Be sure to select a high quality primer that is recommended and compatible with rubber and vinyl, such as a 100% acrylic or a 100% acrylic latex paint primer. Test compatibility on an un-installed piece of wall base to confirm adhesion, compatibility and performance.

Once the primer has properly dried, the wall base can be painted with a high quality acrylic latex paint. Follow all primer and paint manufacturer's recommendations and guidelines. Confirm proper maintenance procedures for paint prior to cleaning. In lieu of painting, we do offer custom or matched colors at low quantities to provide excellent coordination within projects.



7B3 Treads . Guide Specification

Resilient Flooring Specification

SECTION 09 65 13.23

Resilient Stair Treads and Risers

Created August 2020

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Flooring and accessories as shown on the drawings and schedules and as indicated by the requirements of this section.
- B. Related Documents
 - 1. Drawings and General Provisions of the Contract (including General and Supplementary Conditions and Division 1 sections) apply to the work of this section.

1.02 REFERENCES

- A. Armstrong Flooring Technical Manuals
 - 1. Armstrong Flooring Guaranteed Installation Systems manual, F-5061
- B. ASTM International:
 - 1. ASTM E 648 Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source
 - 2. ASTM E 662 Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials
 - 3. ASTM F 710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring
 - 4. ASTM F 2169 Standard Specification for Resilient Stair Tread
 - 5. ASTM F 1482, Standard Guide to Wood Underlayment Products Available for Use Under Resilient Flooring
 - 6. ASTM F 1861 Standard Specification for Resilient Wall Base
 - 7. ASTM F 1869 Standard Test Method for Measuring Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
 - 8. ASTM F 2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes
- C. National Fire Protection Association (NFPA):
 - 1. NFPA 253 Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source

2. NFPA 258 Standard Test Method for Measuring the Smoke Generated by Solid Materials

1.03 SYSTEM DESCRIPTION

- A. Performance Requirements: Provide flooring which has been manufactured, fabricated and installed to performance criteria certified by manufacturer without defects, damage, or failure.
- B. Administrative Requirements
 - 1. Pre-installation Meeting: Conduct an on-site pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions and manufacturer's warranty requirements. Comply with Division 1 Project Management and Coordination (Project Meetings) Section.
 - 2. Pre-installation Testing: Conduct pre-installation testing as follows: [Specify testing (i.e. moisture tests, bond test, pH test, etc)
- C. Test Installations/ Mock-ups: Install at the project site a job mock-up using acceptable products and manufacturer approved installation methods, including concrete substrate testing. Obtain Owner's and Consultant's acceptance of finish color, texture and pattern, and workmanship standards.
 - 1. Mock-Up Size: 3 stair treads.
 - 2. Maintenance: Maintain mock-up during construction for workmanship comparison; remove and legally dispose of mock-up when no longer required.
 - 3. Incorporation: Mock-up may be incorporated into the final construction with Owner's approval.
- D. Sequencing and Scheduling
 - 1. Install flooring and accessories after the other finishing operations, including painting, have been completed. Close spaces to traffic during the installation of the flooring.
 - 2. Do not install flooring over concrete slabs until they are sufficiently dry to achieve a bond with the adhesive, in accordance with the manufacturer's recommended bond, moisture tests and pH test.

1.04 SUBMITTALS

- A. Submit shop drawings, seaming plan, coving details, and manufacturer's technical data, installation and maintenance instructions (latest edition of <u>Armstrong Flooring Guaranteed</u> <u>Installation Systems</u> manual, F-5061) for flooring and accessories.
- B. Submit the manufacturer's standard samples showing the required colors for flooring and applicable accessories.
- C. Submit Safety Data Sheets (SDS) available for adhesives, moisture mitigation systems, primers, patching/leveling compounds, floor finishes (polishes) and cleaning agents and Material Information Sheets for flooring products.
- D. Closeout Submittals: Submit the following:
 - 1. Operation and Maintenance Data: Operation and maintenance data for installed products in accordance with Division 1 Closeout Submittals (Maintenance Data and Operation Data) Section. Include methods for maintaining installed products, and precautions against cleaning materials and methods detrimental to finishes and performance.
 - 2. Warranty: Warranty documents specified herein

1.05 QUALITY ASSURANCE

- A. Single-Source Responsibility: provide types of flooring and accessories supplied by one manufacturer, including moisture mitigation systems, primers, leveling and patching compounds, and adhesives.
- B. Select an installer who is experienced and competent in the installation of rubber stair treads and risers and the use of Armstrong Flooring subfloor preparation products.
 - 1. Engage installers certified as Armstrong Commercial Flooring Certified Installers
 - 2. Confirm installer's certification by requesting their credentials
- C. Fire Performance Characteristics: Provide resilient vinyl composition tile flooring with the following fire performance characteristics as determined by testing material in accordance with ASTM test methods indicated below by a certified testing laboratory or other testing agency acceptable to authorities having jurisdiction:
 - 1. ASTM E 648 Critical Radiant Flux of 0.45 watts per sq. cm. or greater, Class I
 - 2. ASTM E 662 (Smoke Generation) Maximum Specific Optical Density of 450 or less

1.06 DELIVERY, STORAGE AND HANDLING

- A. Comply with Division 1 Product Requirements Sections
- B. Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
- C. Deliver materials in good condition to the jobsite in the manufacturer's original unopened containers that bear the name and brand of the manufacturer, project identification, and shipping and handling instructions.
- D. Store materials in a clean, dry, enclosed space off the ground, protected from harmful weather conditions and at temperature and humidity conditions recommended by the manufacturer. Protect adhesives from freezing. Store flooring, adhesives and accessories in the spaces where they will be installed for at least 48 hours before beginning installation.

1.07 PROJECT CONDITIONS

A. Maintain a minimum temperature in the spaces to receive the flooring and accessories of 65° F (18° C) and a maximum temperature of 85° F (29° C) for at least 48 hours before, during, and for not less than 48 hours after installation. Thereafter, maintain a minimum temperature of 55° F (13° C) in areas where work is completed. Protect all materials from the direct flow of heat from hot-air registers, radiators, or other heating fixtures and appliances. Refer to the <u>Armstrong Flooring Guaranteed Installations Systems</u> manual, F-5061 for a complete guide on project conditions.

1.08 LIMITED WARRANTY

- A. Resilient Flooring: Submit a written warranty executed by the manufacturer, agreeing to repair or replace resilient flooring that fails within the warranty period.
- B. Limited Warranty Period: 5 years
- C. Limited Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.
- D. For the Limited Warranty to be valid, this product is required to be installed using the appropriate Armstrong Flooring Guaranteed Installation System. Product installed not using the specific instructions from the Guaranteed Installation System will void the warranty.

1.09 EXTENDED SYSTEM LIMITED WARRANTY

- A. Resilient Flooring System: Submit a written warranty executed by the manufacturer, agreeing to repair or replace system (subfloor preparation products, adhesive, and floor covering) that fails within the warranty period.
- B. Limited Warranty Period: 10 years on top of the Resilient Flooring Limited Warranty
- C. [S-453 Level Strong[™] cement based self-leveling compound] [S-456 Patch Strong[™] flexible patching and smoothing compound] [S-454 Prime Strong[™] acrylic primer for porous substrates] [S-455 Prime Strong[™] acrylic primer for non-porous substrates] [S-452 Seal Strong[™] two-part moisture mitigation system]
- D. The installation of an Armstrong Flooring product along with the recommended Armstrong Flooring adhesive, as well as any one of the Strong System subfloor preparation products listed above, provides 10 additional years of limited warranty coverage. The Strong System limited warranty covers the installation integrity for the length of the flooring product warranty plus 10 years. In order to qualify for the Strong System Warranty, any subfloor preparation product needed for an installation must be an Armstrong Flooring product.
- E. For the System Limited Warranty to be valid, this product is required to be installed using the appropriate Armstrong Flooring Guaranteed Installation System. Product installed not using the specific instructions from the Guaranteed Installation System will void the warranty.
- F. When Armstrong Flooring Strong System subfloor preparation products are used with other manufacturers' floor coverings, adhesives, or other subfloor preparation products, Armstrong Flooring warrants our products to be free from manufacturing defects from the date of purchase through the limited warranty period of 15 years.

1.10 MAINTENANCE

- A. Extra Materials: Deliver extra materials to Owner. Furnish extra materials from same production run as products installed. Packaged with protective covering for storage and identified with appropriate labels.
 - 1. Quantity: Furnish quantity of flooring units equal to 5 % of amount installed.
 - 2. Delivery, Storage and Protection: Comply with Owner's requirements for delivery, storage and protection of extra material.

PART 2 - PRODUCTS

2.01 MANUFACTURER

A. Resilient rubber stair treads with integrated risers, wall base, adhesives and subfloor preparation products and accessories:

Armstrong Flooring Inc., 2500 Columbia Avenue, Lancaster, PA 17604, www.armstrongflooring.com/commercial

OR EQUAL

2.02 RESILIENT FLOORING MATERIALS

- A. Provide Armstrong Rubber Stair Treads with Integral Risers manufactured in the United States of America.
 - 1. Description: An unbacked, nonlayered, homogeneous tread with integrated riser and stair nose. The colors and pattern detail are dispersed uniformly throughout the thickness of the product. Colors are insoluble in water and resistant to cleaning agents and light.
 - 2. The tile shall conform to the requirements of ASTM F 2169, Type TP, Class 2.
 - 3. Pattern and Color: See FLOOR FINISH SCHEDULE
 - 4. Profile: [Raised Round]
 - Size: [20 in. x 48.5 in. (508 mm x 1232 mm]; [20 in. x 50.25 in. (508 mm x 1276 mm)]; [20 in. x 72.5 in. (508 mm x 1842 mm)]; [20 in. x 74.25 in. (508 mm x 1886 mm)]
 - 6. Thickness:1/8 in./0.125 in. (3.18 mm)

2.03 PRODUCT SUBSTITUTION

A. Substitutions: MUST BE SUBMITTED AND ACCEPTED PRIOR TO BID

2.05 ADHESIVES

A. Provide Armstrong S-726 Adhesive for use under rubber stair treads and for the riser as recommended by the resilient flooring manufacturer. Provide Armstrong S-727 Adhesive for use under the stair nose.

2.06 ACCESSORIES

- A. For patching, smoothing, and leveling monolithic subfloors (concrete, terrazzo, quarry tile, ceramic tile, and certain metals), provide Armstrong [S-184 Fast-Setting Cement-Based Patch and Underlayment] [S-194 Cement-Based Patch, Underlayment and Embossing Leveler / S-195 Underlayment Additive] [S-453 Level Strong[™] cement based self-leveling compound] [S-456 Patch Strong[™] flexible patching and smoothing compound].
- B. [For priming porous substrates to aid in adhesive bond strength and reducing subfloor porosity, provide S-454 Prime Strong[™] acrylic primer for porous substrates. For non-porous substrates, provide S-455 Prime Strong[™] acrylic primer for non-porous substrates].
- C. [For creating a moisture barrier, provide S-452 Seal Strong[™] two-part moisture mitigation system].
- D. For sealing joints between the top of wall base or integral cove cap and irregular wall surfaces such as masonry, provide plastic filler applied according to the manufacturer's recommendations.
- E. Provide transition/reducing strips tapered to meet abutting materials.
- F. Provide threshold of thickness and width as shown on the drawings.
- G. Provide resilient edge strips of width shown on the drawings, of equal gauge to the flooring, homogeneous vinyl or rubber composition, tapered or bullnose edge, with color to match or contrast with the flooring, or as selected by the Architect from standard colors available.
- H. Provide metal edge strips of width shown on the drawings and of required thickness to protect exposed edges of the flooring. Provide units of maximum available length to minimize the number of joints. Use butt-type metal edge strips for concealed anchorage or overlap-type metal edge strips for exposed anchorage. Unless otherwise shown, provide strips made of extruded aluminum with a mill finish.

PART 3 - EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS

A. Compliance: Comply with manufacturer's product data, including technical bulletins, product catalog, installation instructions, and product carton instructions for installation and maintenance procedures as needed.

3.02 EXAMINATION

- A. Site Verification of Conditions: Verify substrate conditions (which have been previously installed under other sections) are acceptable for product installation in accordance with manufacturer's instructions (i.e. moisture tests, bond test, pH test, etc.).
- B. Visually inspect flooring materials, adhesives and accessories prior to installation. Flooring material with visual defects shall not be installed and shall not be considered as a legitimate claim.
- C. Examine subfloors prior to installation to determine that surfaces are smooth and free from cracks, holes, ridges, and other defects that might prevent adhesive bond or impair durability or appearance of the flooring material.
- D. Inspect subfloors prior to installation to determine that surfaces are free from curing, sealing, parting and hardening compounds; residual adhesives; adhesive removers; and other foreign materials that might prevent adhesive bond. Visually inspect for evidence of moisture, alkaline salts, carbonation, dusting, mold, or mildew.
- E. Report conditions contrary to contract requirements that would prevent a proper installation. Do not proceed with the installation until unsatisfactory conditions have been corrected.
- F. Failure to call attention to defects or imperfections will be construed as acceptance and approval of the subfloor. Installation indicates acceptance of substrates regarding conditions existing at the time of installation.

3.03 PREPARATION

A. [Subfloor Preparation: Smooth concrete surfaces, removing rough areas, projections, ridges, and bumps, and filling low spots, control or construction joints, and other defects with Armstrong Flooring [S-184 Fast-Setting Cement-Based Patch and Underlayment][S-194 Cement-Based Patch, Underlayment and Embossing Leveler / S-195 Underlayment Additive] [S-453 Level Strong[™] cement based self-leveling compound] [S-456 Patch Strong[™] flexible patching and smoothing compound] [S-454 Prime Strong[™] acrylic primer for porous substrates] [S-455 Prime Strong[™] acrylic primer for non-porous substrates] as recommended by the flooring manufacturer. Refer to <u>Armstrong Flooring Guaranteed Installation Systems</u> manual, F-5061 and ASTM F 710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring for additional information on subfloor preparation.]

- B. [Subfloor Preparation Moisture Mitigation: Smooth concrete surfaces, removing rough areas, projections, ridges, and bumps, and filling low spots, control or construction joints, mitigate moisture and other defects with Armstrong Flooring [S-184 Fast-Setting Cement-Based Patch and Underlayment][S-194 Cement-Based Patch, Underlayment and Embossing Leveler / S-195 Underlayment Additive] [S-453 Level Strong[™] cement based self-leveling compound] [S-456 Patch Strong[™] flexible patching and smoothing compound] [S-452 Seal Strong[™] two-part moisture mitigation system] [S-454 Prime Strong[™] acrylic primer for porous substrates] [S-455 Prime Strong[™] acrylic primer for non-porous substrates] as recommended by the flooring manufacturer. Refer to <u>Armstrong Flooring Guaranteed Installation Systems</u> manual, F-5061 and ASTM F 710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring for additional information on subfloor preparation.]
- C. Subfloor Cleaning: The surface shall be free of dust, solvents, varnish, paint, wax, oil, grease, sealers, release agents, curing compounds, residual adhesive, adhesive removers and other foreign materials that might affect the adhesion of resilient flooring to the concrete or cause a discoloration of the flooring from below. Remove residual adhesives as recommended by the flooring manufacturer. Remove curing and hardening compounds not compatible with the adhesives used, as indicated by a bond test or by the compound manufacturer's recommendations for flooring. Avoid organic solvents. Spray paints, permanent markers and other indelible ink markers must not be used to write on the back of the flooring material or used to mark the concrete slab as they could bleed through, telegraphing up to the surface and permanently staining the flooring material. If these contaminants are present on the substrate, they must be mechanically removed prior to the installation of the flooring material. Refer to the <u>Armstrong Flooring Guaranteed Installation Systems</u> manual, F-5061 and ASTM F 710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring for additional information on subfloor preparation.
- D. Wood subfloors: Armstrong resilient floors are recommended on suspended wood subfloors with a 1/4" underlayment (see product installation systems for exceptions) and a minimum of 18" of well-ventilated air space below. Armstrong Flooring does not recommend installing resilient flooring on wood subfloors applied directly over concrete or on sleeper-construction subfloors. Loading requirements for subfloors are normally set by various building codes on both local and national levels. Trade associations such as APA–The Engineered Wood Association provide structural guidelines for meeting various code requirements. Subfloor panels are commonly marked with span ratings showing the maximum center-to-center spacing in inches of supports over which the panels should be placed.
 - Refer to the <u>Armstrong Flooring Guaranteed Installation Systems</u> manual, F-5061 and ASTM F 1482, Standard Guide to Wood Underlayment Products Available for Use Under Resilient Flooring for additional information.
- E. Wood subfloors Surface Cleaning: Make subfloor free from dust, dirt, grease, and all foreign materials.
 - 1. Check panels for sources of discoloration such as contamination from paint, varnish, stain overspray or spills, plumbing sealers, asphalt, heater fuel, markers or potential staining agents such as wood or bark not visible on the surface, edge sealers, logo markings, printed nail patterns and synthetic patches.
 - 2. Remove old adhesive.
 - 3. Cover adhesive, oil or wax residue with an appropriate underlayment. If the residue is tacky, place a layer of felt or polyethylene sheeting over it to prevent a cracking sound when walking on the floor.

- 4. Remove all paint, varnish, oil and wax from all subfloors. Many buildings constructed before 1978 contain lead-based paint, which can pose a health hazard if not handled properly. State and federal regulations govern activities that disturb lead-based painted surfaces and may also require notice to building occupants. Do not remove or sand lead-based paint without consulting a qualified lead professional for guidance on lead-based paint testing and safety precautions. Armstrong Flooring does not recommend the use of solvents to remove paint, varnish, oil, wax or old adhesive residues because the solvents can remain in the subfloor and negatively affect the new installation. Whenever sanding, be certain the work site is well ventilated and avoid breathing dust. If high dust levels are anticipated, use appropriate National Institute for Occupational Safety and Health (NIOSH) designated dust respirator. All power sanding tools must be equipped with dust collectors. Avoid contact with skin or eyes. Wear gloves, eye protection and long-sleeve, loose fitting clothes
- 5. For additional information on the installation and preparation of wood and board-type underlayment see the current edition of ASTM F1482, "Standard Practice for Installation and Preparation of Panel Type Underlayments to Receive Resilient Flooring."
- 6. Vacuum or broom-clean surfaces to be covered immediately before the application of flooring.

3.04 INSTALLATION OF FLOORING

- A. Install flooring in strict accordance with the latest edition of <u>Armstrong Flooring Guaranteed</u> <u>Installation Systems</u> manual, F-5061. Failure to comply may result in voiding the manufacturer's warranty listed in Section 1.08.
- B. Install flooring wall to wall before the installation of floor-set cabinets, casework, furniture, equipment, movable partitions, etc. Extend flooring into toe spaces, door recesses, closets, and similar openings as shown on the drawings.
- C. If required, install flooring on pan-type floor access covers. Maintain continuity of color and pattern within pieces of flooring installed on these covers. Adhere flooring to the subfloor around covers and to covers.
- D. Scribe, cut, and fit to permanent fixtures, columns, walls, partitions, pipes, outlets, and builtin furniture and cabinets.
- E. Install flooring with adhesives, tools, and procedures in strict accordance with the manufacturer's written instructions. Observe the recommended adhesive trowel notching, open times, and working times.

3.05 INSTALLATION OF ACCESSORIES

- A. Apply top set wall base to walls, columns, casework, and other permanent fixtures in areas where top-set base is required. Install base in lengths if practical, with inside corners fabricated from base materials that are mitered or coped. Tightly bond base to vertical substrate with continuous contact at horizontal and vertical surfaces.
- B. Fill voids with plastic filler along the top edge of the resilient wall base or integral cove cap on masonry surfaces or other similar irregular substrates.
- C. Place resilient edge strips tightly butted to flooring, and secure with adhesive recommended by the edge strip manufacturer. Install edge strips at edges of flooring that would otherwise be exposed.

D. Apply [butt-type] [overlap] metal edge strips where shown on the drawings, [before] [after] flooring installation. Secure units to the substrate, complying with the edge strip manufacturer's recommendations.

3.06 CLEANING

A. Perform initial and on-going maintenance according to the latest edition of the maintenance recommendations for Stair Treads and Landing Tiles.

3.07 PROTECTION

A. Protect installed flooring as recommended by the flooring manufacturer against damage from rolling loads, other trades, or the placement of fixtures and furnishings. (See Finishing the Job in the latest edition of <u>Armstrong Flooring Guaranteed Installation Systems</u> manual, F-5061.)

END OF SECTION

	MATERIAL	MANUFACTURER	STYLE	COLOR	SIZE	LOCATION
SV1	VCT	ARMSTRONG- STANDARD EXCELON	IMPERIAL TEXTURE	DOESKIN PEACH,51801031, N740A	12" X 12" X 1/8"	FIELD, ALL
SV2	VCT	ARMSTRONG- STANDARD EXCELON	IMPERIAL TEXTURE	CURRIED CARAMEL, 51942031, P426C	12" X 12" X 1/8"	ACCENT, various
SV3	VCT	ARMSTRONG- STANDARD EXCELON	IMPERIAL TEXTURE	HEAT WAVE 57538031,	12" X 12" X 1/8"	ACCENT, various
SV4	VCT	ARMSTRONG- STANDARD EXCELON	IMPERIAL TEXTURE	MARINE BLUE- 51820031 - P490G	12" X 12" X 1/8"	ACCENT, various
SV5	VCT	ARMSTRONG- STANDARD EXCELON	IMPERIAL TEXTURE	TEAL -51906031	12" X 12" X 1/8"	ACCENT, various
STAIRS	RUBBER	ARMSTRONG STAIR	R6CES	ESSENTIAL SAND		STAIRS
RB	RUBBER BASE	ROPPE PINNACLE		618 - AUBERGINE	6"	ALL VCT AND LVT

FINISH NOTES:

1. PROTECT ALL TENANT AND COMMON AREAS FINISHES NOT SCHEDULED FOR MODIFICATION

2. CONFIRM ALL PROPOSED FLOOR MATERIALS AND INCLUDE LEVELING/FLOATING AS REQUIRED TO ACHIEVE A PROFESSIONAL AND AESTHETICALLY ACCEPTABLE FINISH.

3. ALL FLOORING TRANSITIONS TO BE FLOATED

4. WHERE FLOOR COVERING TRANSITIONS AT DOOR OPENINGS, LOCATE SEAM UNDER CENTER OF DOOR WHEN IN CLOSED POSITION.

5. ALL VCT FLOORING TO BE SEALED AND BUFFED BY CONTRACTOR PRIOR TO OCCUPANCY.

6. FLOORING INSTALLER TO SUBMIT FLOORING PATTERN DIAGRAMS FOR OWNER APPROVAL PRIOR TO INSTALLATION.

7. CONTRACTOR TO SUBMIT ANY AND ALL FINISH SAMPLES, SHOP DRAWINGS, AND/OR PRODUCT INFORMATION FOR REVIEW AND APPROVAL PRIOR TO ORDER PLACEMENT.

8. FOR PRODUCTS SPECIFIED BY MANUFACURER "OR EQUAL" SUBMIT REQUEST FOR SUBSTITUTION PRIOR TO BID SUBMITTAL.

COLOR	TYPE	ROOM
DOESKIN PEACH,51801031, N740A	FIELD, ALL	ALL, EXCEPT STAIRS
CURRIED CARAMEL, 51942031, P426C	ACCENT, various	
HEAT WAVE 57538031,	ACCENT, various	
MARINE BLUE- 51820031 - P490G	ACCENT, various	
TEAL -51906031	ACCENT, various	
ESSENTIAL SAND	STAIRS	STAIRS

Gary and Mary West Wellness Center Scope of Work Roofing Recoat and Flooring Replacement Owner's Specifications - 7C Specials

This section pertains to additional scopes of work including: Crossover Stair Bridge and Furniture Moving Requirements.

A. CROSSOVER STAIR BRIDGE

- a. Submittal: Standard Crossover Bridge, Cotterman 7SCA36A3 or equal.
 - i. Substitution of specified product must demonstrate equal quality, durability and warranty.
 - ii. Provide Shop Drawings showing
 - 1. Proposed layout and clearance of roof obstructions
 - 2. Foot pads Details showing proper distribution of weight with maximum acceptable loads per California Building Code Standards and anchor system.
- b. Examination- examine roof conditions to determine best location for proposed base of crossover stair footings.
- c. Installation: Unit to be attached to roof using standard construction practices ensuring that distribution of weight loads meet roof capability and resistance to wind loads. It is Contractor's responsibility to ensure installation meets all applicable codes.
- d. Roof penetrations to be sealed per roofing specs leaving a watertight membrane.
- e. Roof Framing Plan available upon request.
- B. FIXED LADDER
 - a. Submittal: Fixed Ladder, Cotterman 4XM77 or equal.
 - i. Substitution of specified product must demonstrate equal quality, durability and warranty.
 - ii. Provide Shop Drawings showing
 - 1. Proposed layout and clearance of roof obstructions
 - 2. Foot pads Details showing proper distribution of weight with maximum acceptable loads per California Building Code Standards and anchor system.
 - f. Examination- examine roof conditions to determine best location for proposed location..
 - g. Installation: Unit to be attached to roof parapet using standard construction practices ensuring that distribution of weight loads meet roof capability and resistance to wind loads. It is Contractor's responsibility to ensure installation meets all applicable codes. Follow manufacturer's installation recommendations.
 - h. Roof penetrations to be sealed per roofing specs leaving a watertight membrane.

C. FURNITURE MOVING

a. All furniture to be removed from areas prior to flooring installation. Furniture and room contents to be stored and protected from damage. Furniture and room contents to be returned to areas of origin once flooring is complete. b. Storage space available in covered parking spaces on site.

c.. Touch up paint to match and cleaning is required due to damage on walls, flooring and other surfaces.

D. WORK HOURS: MONDAY THROUGH FRIDAY, 2:00 PM - 10:00 PM. The Gary and Mary West Senior Center is open every day, year round.

E. HEALTH AND SAFETY REQUIREMENTS: TBD

F. PREVAILING WAGE : THIS IS A PREVAILING WAGE RATE PROJECT. ALL FEDERAL AND STATE PREVAILING WAGE RATES APPLY, WHICHEVER IS GREATER.