SECTION 07560 – FLUID APPLIED ROOFING SYSTEM

PART 1 – GENERAL

1.01 RELATED SECTIONS

The General Provisions of the contract, including the General Provisions for Construction Projects (2016), Special Provisions, and General Requirements of the Specifications, apply to the work specified in this section

1.02 DESCRIPTION

A. Furnish and install an instant-setting, liquid-applied, roof membrane system complete, in place, as shown on the drawings, specified herein, or needed for a complete and proper watertight and warrantable installation. The two-component, cold spray-applied rubber membrane shall be monolithically applied in one spray coat to the field and flashing areas at specified rate to create a membrane. The one-component, brush-applied rubber is used as a patching and flashing reinforcement compound to the system as needed after it has cured. An energy efficient and sustainable acrylic elastomeric topcoat will then be applied to the entire roof surface for UV protection, water resistance, and thermal shock reduction. In some climate zones, there are options for either a granulated wear layer or no topcoat.

1.03 QUALITY ASSURANCE

A. Standards: Comply with standards specified in this section and as listed in the General Requirements.

B. Qualifications of Manufacturer: The core products used in the roofing work and included in this section shall be manufactured directly by the manufacturer and not through a third-party mixing company or private label. Quality control measures include testing and retaining samples of every product batch by the manufacturer.

C. Qualifications of Installers: The Contractor and his personnel shall be currently approved by the manufacturer and only those spray technicians that have been certified through the manufacturer's training program are to spray the roof membrane.

D. Roofing Inspections: Make all required notifications and secure all required inspections by the manufacturer of the approved materials to facilitate issuance of the specified roof warranty.

E. Manufacturer's Pre-Review: The manufacturer shall review and approve the existing roof substrate that is to be recovered with the two-component, cold spray-

applied rubber system with respect to the appropriateness of the substrate for use of their recover system on this project.

F. Spray Equipment: The two-component, cold spray-applied rubber membrane and acrylic elastomeric topcoat may only be applied with spray equipment specifically manufactured for and supplied by the coating's manufacturer.

1.04 SUBMITTALS

A. Product Data: Prior to project starting, submit:

1. Complete material list of all items proposed to be furnished and installed under this section, along with product data and SDS sheets for each.

2. Manufacturer's pre-review comments and other data required to demonstrate compliance with specified requirements.

3. Moisture scan findings using a Tramex moisture meter or an infrared camera to check for pre-existing moisture in the old roofing system that will require replacement prior to installation of the two-component, cold spray-applied rubber system over it.

1.05 PRODUCT HANDLING

A. Delivery and Storage

1. Deliver all packaged materials to the job site in their original, unopened containers with all labels intact and legible at the time of the inspection.

2. Store all materials in an approved manner and protected from freezing or extreme heat. Storage temperature to be maintained above 50 degrees Fahrenheit (10°C).

3. Protect materials during handling and application to prevent damage or contamination.

B. Protection: Use all necessary means to protect the materials in this section before, during, and after installation, and to protect the work and materials of all other trades.

C. Replacements: In the event of damage, immediately make all repairs and replacements necessary to be approval of and at no additional cost to the Owner.

1.06 SCHEDULING

A. Work is to be performed on a daily basis with appropriate scheduling of product applications to prevent contamination of the surfaces between applications. Products shall be installed only if temperatures do not dip below freezing for 72 hours after applying, and daytime temperature reaches 50 degrees Fahrenheit (10° C) or higher.

B. Final completion of work shall be defined as the installation of all specified primer, roof membrane, top coating, flashing, counterflashing, sheet metal, fasteners, and caulking.

C. Contractor shall complete installation of the two-component, cold spray-applied rubber products within two (2) days after cleaning the existing substrate. After installation of the two-component, cold spray-applied rubber, a light rinsing of the surface to remove dry accelerator is required prior to top coating, no earlier than 6 hours after the two-component, cold spray-applied rubber installation. Top coating not to occur before the two-component, cold spray-applied rubber and the one-component, brush-applied rubber are completely dried. If top coating is performed later than three (3) days after completion of the two-component, cold spray-applied rubber and the one-component, brush-applied rubber, another rinsing may be required to remove dust and dirt accumulations depending on the environment.

1.07 WARRANTY

A. As part of the work of this section, pay all required fees, secure all required inspections, and complete all items necessary to secure and deliver to the Owner a manufacturer's warranty of 20 years. All warranties are eligible for extensions.

Duration	Covers*	Two-component, cold spray-applied rubber thickness	Topcoat Thickness	Extendable
20 Years	Material & Labor Costs	130 wet/80 dry mil	50 wet/20 dry mil	Yes

B. Contractor to provide photographs of areas to receive liquid membrane before start of work, during surface preparation, during spray application, and at completion of work for warranty acceptance.

C. The Surety shall not be held liable beyond 2 years from project acceptance date.

PART 2 - PRODUCTS

2.01 GENERAL

A. Minimum product requirements have been listed. All of these components must be used and bid. Products not supplied by the manufacturer are to be purchased from a manufacturer approved source.

2.02 PRODUCTS SUPPLIED BY WARRANTY MANUFACTURER

A. Liquid Membrane – Two-Component, Cold Spray-Applied Synthetic Rubber

Spray-applied, instant-setting liquid-applied membrane and applied by a manufacturer certified installer to create a waterproofing membrane. The two-component, cold spray-applied rubber is water-based and solvent-free, which transforms into an instant-setting seamless rubberized roof membrane as it is spray-applied to the substrate and catalyzed by an accelerator component. The liquid is spray-applied in a single coat to achieve a minimum monolithic membrane thickness of either 60 dry mils for 10-year or 15-year warranties, or 80 dry mils for 20-year warranties, and possess physical properties of no less than the values listed below:

Property	Test Method	Value
Solid Content	Vacuum cure	63%
Flame Exposure	ASTM E108	Class A, Self-Extinguishing
Water Vapor Permeability	ASTM E96	0.1 perms
Elongation	ASTM D412	1200% or greater
Tensile Strength	ASTM D412	500 psi or greater
Hydrostatic Pressure	BS EN 12390-8	Pass – No penetration
Impact and Hail Resistance	ASTM D3746	Pass
Dynamic Puncture Resistance	ASTM D5635	2.80 J/mm or greater
Pull-off Adhesion to EPDM (1000 hr UV)	ASTM D4541	700 psi or greater
1000 hr UV Exposure (Xenon)	ASTM G155	No effect
Cured to the Touch	After Sprayed	Instantly
VOC Content	--	None
Wind, Fire, Hail, Foot Traffic, UV	FM 4470	Pass (Class A, Severe Hail)

B. Patching and Flashing Membrane – One-Component, Brush-Applied Rubber

1. One-Component, Brush-Applied Rubber – Brush-applied, water-based, solvent-free, single-component waterproofing membranes used for touch-up

patching and reinforcing of flashing areas in the two-component, cold spray-applied rubber membrane.

C. Reflective/ Protective Topcoat (Select the appropriate coating that meets the building requirements)

1. Highly reflective, instant-setting, water-based acrylic elastomeric topcoat: It is spray-applied to the substrate using specialized equipment and catalyzed by an accelerator component. Color: White

2. Highly reflective, water-based acrylic elastomeric topcoat: It is spray-applied using standard airless spray equipment, brush-applied, or roller-applied. Typically provided in white, gray, or tan. Custom colors available upon request.

3. Thermal insulating, reflective, water-based acrylic elastomeric white top coating: Ceramic and glass microspheres within the top coating not only reflect UV rays, but also reduce heat transfer, making it a superior energy saving solution when used as part of the two-component, cold spray-applied rubber membrane system.

D. Catalyst (Accelerator)

1. ACCELERATOR: Specialty non-toxic, food-grade Calcium Chloride (CaCl) and water mixture used as the catalyst component in conjunction with spraying the two-component, cold spray-applied rubber and acrylic elastomeric topcoat, allowing for the rapid build-up of the membrane to any thickness desired in one coat.

E. Repair Tape

1. Premium-grade butyl repair tape with TPO-facer. Available in black or white. Used to repair existing substrate in a variety of situations.

F. Walkways

1. Water-based acrylic elastomeric coating used as a seamless walkway coating. Contains on aggregate to form a textured, non-slip surface with high abrasion resistance. Can be reinforced with polyester fabric to provide a higher level of protection from equipment damage in areas of high abuse. Available in gray or yellow.

G. Reinforcement Fabric

1. High-strength polyester fabric, used to reinforce high-stress and high-movement areas underneath the two-component, cold spray-applied rubber product or within the one-component, brush-applied rubber product.

2.03 EQUIPMENT SUPPLIED BY MANUFACTURER

A. Spray machine and testing gauges/meters

1. Dual-component spray rig consisting of spray gun, hoses, pumps, and cart.

2. High Production Spray Machine: dual-component spray rig consisting of spray gun, hoses, pumps, and cart.

3. Two-component, cold spray-applied rubber mil gauge for testing wet mil thickness while spraying the instant set liquid membrane.

4. Standard paint mil gauge for testing wet mil thickness of topcoat.

PART 3 – EXECUTION

3.01 DESCRIPTION

A. The latest manufacturer application techniques are to be followed along with the following requirements. These specific minimum requirements must be included in the bid and are not to be altered.

3.02 INSPECTION

A. Examine the existing roof conditions under which work in this section will be installed. Correct conditions detrimental to the proper and timely completion of the work such as wet underlying insulation, loose membrane, and severe degradation. Do not proceed until such conditions have been corrected.

3.03 SURFACE CONDITIONS

A. Surfaces scheduled to receive waterproofing are to be sound, clean, dry and free of any dust, grease, oil, laitance, and other contaminants.

B. Substrate is to be free of sharp projections and free of loose components.

C. The existing roof system is to be scanned for moisture to locate and replace any wet areas of insulation, trapped moisture, or, if applicable, wet gypsum deck, with new insulation and membrane to match existing. Insulation and membrane

replacement must be properly attached prior to application of the two-component, cold spray-applied rubber system.

3.04 INSTALLATION – PREPARATION OF SUBSTRATE

A. Protect all adjacent surfaces from overspray at all times. Taping off surfaces with painter plastic to prevent overspray onto surfaces and to establish clean, straight edge termination lines on the new liquid membrane flashings is required. Use care when masking air intakes and HVAC units so as not to block all ventilation and potentially damage the unit.

B. Repair all defects in existing substrates, including loose field membrane and flashings, open seams and corners, deteriorated pipe boots and sealant pockets as required by manufacturer. Use like materials to the existing roof type to make repairs. Hot-air weld all repairs where possible. Like materials to the existing roof type should be welded in properly (i.e. PVC membrane should be used to patch an existing PVC roof).

C. All existing metal flashings that are specified to remain must be inspected for watertightness. Any flashing metal such as counterflashing, termination bar, coping caps, edge metal, etc., shall be properly repaired or replaced to achieve a watertight condition. Consult with Manufacturer for further clarification.

D. Remove all dirt, debris, and loose materials from the surface of the roof.

E. Existing surfaces shall be cleaned with pressure washing equipment to a condition conducive to positive adhesion of the two-component, cold spray-applied rubber, per manufacturer's requirements prior to application of the liquid-applied system. Unapproved curing compounds, form release agents, petroleum distillates, animal fats, and other contaminates shall not come into contact with approved substrate after cleaning. Contractor shall complete installation of two-component, cold spray-applied rubber membrane within two (2) days after cleaning of substrate.

F. Verify the substrate is visibly dry on the surface and free of moisture within its components. Moisture meters, infrared scanning, or capillary moisture tested by plastic sheet method according to ASTM D-4263, may be necessary. If moisture is present on the substrate it must be allowed to dry prior to proceeding with the two-component, cold spray-applied rubber application. If moisture is present within the old roofing system components, it must be removed and replaced with same materials prior to installation of the two-component, cold spray-applied rubber. It is also important that shrinkage or stress in the old roofing material be relieved after it is cut open to prevent additional movement/shrinkage after installation.

G. Install one-way vents every 1,200 sq. ft. to allow relief of vapor pressure. Cut a hole through the existing membrane and insulation, but not through the deck. The

hole should not be larger than the diameter of the venting space. Fill the hole with loose-fill insulation to prevent condensation. Place the flange of the one-way vent on top of the roofing membrane and fasten to the roof deck with appropriate fasteners. Immediately seal to a watertight condition with the two-component cold spray-applied rubber, the one-component brush-applied rubber, or approved heat-welded single-ply flashing material.

3.05 INSTALLATION OF LIQUID MEMBRANE

A. General:

1. Stir materials prior to application using a drill and mixing paddle in accordance with manufacturer's instructions.

2. Spray the instant-set two-component, cold spray-applied rubber and Accelerator as a continuous, monolithic membrane of uniform thickness, beginning at the lowest point and terminating at the highest point. Final membrane thickness after full cure must be a minimum, on all surfaces, 97 wet/60 dry mils for 10-year and 15-year warranties and 130 wet/80 dry mils for 20-year warranties.

3. When a spot repair is required during application, re-spray defect area within 15 minutes of initial spray application so entire membrane cures monolithically.

B. Horizontal and Vertical Application:

1. Spray-apply one continuous layer of the two-component, cold spray-applied rubber waterproofing membrane, covering all areas of the field and flashings to achieve a cured dry mil membrane thickness of 60 or 80 mils, depending on warranty requirements.

2. Perform wet mil thickness tests (with a manufacturer supplied mil gauge) at regular intervals while spraying to assure a minimum of 97 wet mils throughout for 60 dry mils, and 130 wet mils for 80 dry mils. Immediately re-spray spots checked with gauge to fill in void.

3. If necessary, chalk-line or spray-paint a grid across the roof prior to application to gauge product use per drum within a particular section of the roof area. To achieve 60 dry mils, the average rate shall be 800 sq. ft per drum. To achieve 80 mil dry, the average rate shall be 600 sq. ft. per drum. This application rate will vary based on number of seams, penetrations, surface texture and conditions, etc.

Wet/Dry Mil Thickness	Coverage Rate Per Drum
97/60	800 square feet
130/80	600 square feet

4. If reinforcement fabric is to be used, first apply a thin base layer of the one-component, brush-applied rubber (or the two-component, cold spray-applied rubber liquid with no Accelerator) on the surface. Embed 4" or 6" polyester fabric into the wet, coating and use a brush to smooth and saturate the fabric with the coating. Apply more product, if needed, to fully saturate the fabric, but not create any pooling. Immediately apply the two-component, cold spray-applied rubber with the Accelerator on top of the reinforcement to create the final membrane. Please consult with Manufacturer or Designer for details on where reinforcement is required.

5. Refer to manufacturer's recommendations and details for proper membrane terminations.

3.06 INSTALLATION OF BUSH-GRADE ON FLASHING, PENETRATIONS, AND TRANSITIONS

A. Transition Detailing and Flashing, including Pipes, 90-Degree Angles, Gutter Transitions, Penetrations, Curbs, Inside and Outside Corners, etc.: All flashing details and transition changes shall be prepared as follows:

1. After the two-component, cold spray-applied rubber membrane is fully dry to the touch with no moisture coming out of the membrane when pressed by hand, all flashing transitions shall receive an additional brush application of the one-component brush-grade. Additionally, apply one-component, brush-applied rubber to any visible voids, imperfections, or thin spots in the two-component, cold spray-applied rubber membrane prior to rinsing and applying top coatings. one-component, brush-applied rubber to be installed by brush or trowel at 97 wet mils to achieve 60 mils dry.

    a. Brush apply a 97 wet mil course of the one-component, brush-applied rubber to extend 3" on each side of all curb corner transitions, 90-degree angles, under metal flashings, base and top edge of all pipe penetrations.

    b. The field of the roof shall be checked over for imperfections in the two-component, cold spray-applied rubber and the one-component, brush-applied rubber shall be brush-applied wherever needed to reinforce suspected thin spots or spray defects. the one-component, brush-applied rubber shall be allowed to cure fully prior to top coating applications. Typical cure time allowance is 24 hours with good weather conditions.

B. Roof Drain Flashing:

1. Check existing drain ring bolts and ensure all are tight. After the two-component, cold spray-applied rubber roof membrane installation is completed on area outside of drain and after proper cure time and rinsing, the one-component, brush-applied rubber shall be applied around inside and outside of the drain ring as well as within the drain bowl to fully seal under the existing membrane to prevent water back-up under the membrane.

    a. Apply 97 wet mils to achieve 60 mils dry of the one-component, brush-applied rubber over the two-component, cold spray-applied rubber roof membrane, extending from inside of drain to 3" outside of clamping ring.

3.07 INSTALLATION OF TOPCOAT FINAL CHECK

A. After the two-component, cold spray-applied rubber and the one-component, brush-applied rubber products are fully dry to the touch with no moisture coming out of the material when pressed on with a hand, rinse dried accelerator from all the two-component, cold spray-applied rubber surfaces with clean water until dried accelerator residue is rinsed completely off of the roof. The surface should be completely dry prior to applying top coatings.

B. Following the application of the two-component, cold spray-applied rubber roof membrane described above, apply the specified reflective, sacrificial topcoat: the instant-setting, water-based acrylic elastomeric topcoat, the water-based acrylic elastomeric topcoat or the thermal insulating, reflective, water-based acrylic elastomeric white top coating. All topcoats are to be installed per the manufacturer's guidelines to achieve a final minimum dry film thickness of 30 wet/20 dry mils for 10-year and 15-year warranties. 20-year warranties require a topcoat applied at 50 wet/30 dry mils.

1. instant-setting, water-based acrylic elastomeric topcoat is installed in one coat to the thickness required.

2. The thermal insulating, reflective, water-based acrylic elastomeric white top coating or the water-based acrylic elastomeric topcoat are installed in two coats and the first coat is to be back-rolled when applying by sprayer, to assure full coverage to textured surface.

D. Installation of top coating shall occur after the two-component, cold spray-applied rubber membrane and the one-component, brush-applied rubber flashings are fully dry, cured, and rinsing of Accelerator has dried. If top coating is performed later than three (3) days after completion of the two-component, cold spray-applied rubber membrane, another rinsing may be required to remove dust and dirt accumulations depending on the environment.

E. In certain climate zones, a reflective topcoat may not be required when approved in writing by the manufacturer. In this event, a thorough rinsing of dried Accelerator should still occur after the two-component, cold spray-applied rubber and the one-component, brush-applied rubber are applied and dry.

F. If applying a granulated wear layer, broadcast 40-50 lbs. of roof granules per 100 sf in a 15 wet mil layer of the two-component, cold spray-applied rubber with no Accelerator over the entire surface. The granules must be supplied by the manufacturer and approved for use in the specific climate zone and project location.

3.08 FIELD QUALITY CONTROL

A. Use of specialized equipment such as a mil gauge supplied by the manufacturer to check the liquid membrane thickness during application and a good quality digital camera to provide photos to manufacturer of installation is required.

B. Contractor to provide photographs of areas to receive liquid membrane before start of work, during surface preparation, during spray application, and at completion of work for warranty acceptance.

3.09 CLEAN-UP

A. All debris shall be removed from the premises promptly and the construction area left clean daily.

B. All overspray of products must be cleaned from surfaces not scheduled to receive the waterproofing membrane.

C. At the completion of the contract, Contractor is to remove and dispose of all equipment or temporary facilities related to their contract within 3 days.

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

A. Work under this section will not be measured nor paid for separately, but shall be considered incidental to and included in the price bid for the various items of work in this project.

END OF SECTION