SECTION 07560

LIQUID-APPLIED ROOFING AND WATERPROOFING

(OVER EXISTING METAL- COMMERCIAL STANDING SEAM ROOFS)

PART 1 GENERAL

1.1 DESCRIPTION

This specification is designed specifically for the application of the MonoSeal Waterproofing System (Primers, MonoBase, TRU™ underlayment, and MonoTop) over the following existing roofing systems:

a) Commercial Standing Seam Metal Panels

1.2 DESCRIPTION OF LIQUID-APPLIED ROOF SYSTEMS

The liquid-applied roofing system shall consist of a reinforced elastomeric system specifically designed for use on a roof. The system must have approval by FMRC (Factory Mutual Research Corporation) according to Standard 4470 for Class 1 Roof Constructions which includes- Spread of Flame Fire, Windstorm Pressure, Windstorm Pull, Hail Damage, Resistance to Foot Traffic, and Susceptibility to Leakage Classifications.

1.3 SECTION INCLUDES

This specification incorporates the application of substrate suitable primers and the installation of the liquid-applied flexible acrylic waterproofing system over a range of existing roofing systems. This work shall include the preparation of the existing substrate, application of the primer(s), application of the new roofing and waterproofing system, the detail work flashing system, and final clean-up.

1.4 RELATED WORK

The contractor shall review all sections of these specifications to determine items of work that will interface with the application of this roofing system. Coordination and execution of related sections shall be the responsibility of the contractor.

1.5 REFERENCES

1. ASTM B117 - Test Method of Salt Spray (Fog) Testing.
2. ASTM G-29 - Test Methods for Algae Resistance.
3. ASTM E-108 - Test Method for Fire Test of Roof Coverings.
4. ASTM D-1653 - Water Vapor Transmission of Materials.
5. ASTM G26 - Practice for Operating Light- and Water-Exposure Apparatus for exposure of Nonmetallic Materials.
6. ASTM D-412 - Ultimate Tensile Strength at Break.
7. ASTM D-6083 - Standard Specification for Liquid Applied Acrylic Coatings used in roofing.
8. ASTM C1549 - Standard test method for determination of solar reflectance near ambient temperature using a portable solar reflectometer
9. ASTM C1371 - Standard test method for determination of emittance of materials near room temperature using portable emissometers
10. FM 4470 - Standard for Class 1 Spread of Flame Fire, Windstorm Pressure, Windstorm Pull, Hail Damage, Resistance to Foot Traffic, and Susceptibility to Leakage Classifications

1.6 SUBMITTALS

1. Shop Drawings: Submit drawings showing the layout of joint reinforcing and all flashing details, including edges, closures, penetrations, etc.

2. Product Data: Provide AguaSeal Acquisition, LLC (AguaSeal) technical data for each of the products that comprise the whole roofing and waterproofing system.

3. Manufacturer's Installation Instructions: Provide technical data and application instruction sheets from AguaSeal for the total scope of work regarding the specific project.

4. Verify field measurements and submit materials list, including quantities, to be applied to achieve specified membrane thickness.

5. Manufacturer's Certificate: Provide Certification that each of the products to be utilized meets or exceed specified requirements.

1.7 QUALIFICATIONS

1. Applicator Qualifications: AguaSeal shall have sole discretion, including the right of refusal to disqualify, regarding the qualifications of the proposed applicator of any AguaSeal products specified for the project. Minimum requirements for approval of Applicators for the specified project are 3 years of known and documented history of successful application of liquid-applied waterproofing systems.

2. Approved Applicators will also have necessary and documented experience in the application of liquid-applied waterproofing systems on roofs of a similar size and scale as specified for this project.

3. Proof of this qualification shall be provided, if and as necessary, in written form by AguaSeal.

1.8 QUALITY CONTROL

1. Codes and Standards: The contractor shall be required to be familiar and acquainted with the building codes, regulations, and standards governing the specified project.

   a) There shall be no variation from these specifications unless said variation is submitted in writing and approved by the specification author and AguaSeal and/or its Technical Sales Representative (TSR).

   b) An Approved Applicator (as designated by AguaSeal) shall be on-site during all applications of any AguaSeal products.

2. Manufacturer's Technical Sales Representative (TSR): AguaSeal TSR shall be on-site as deemed necessary during the application process. At the Building Owner's specific request, the TSR shall, following each site visit, provide a written inspection report. To be in compliance with Warranty requirements, the TSR is required by AguaSeal to approve the application.

3. The application of this coating system must be in accordance with AguaSeal application rate for required dry film thickness, published application instructions, and Material Safety Data Sheets.

4. The specified roofing system must be installed by AguaSeal authorized roofing applicator in compliance with drawings and specifications as provided by AguaSeal.

5. There must be no deviations made from the AguaSeal specification or

AguaSeal's approved shop drawings without the PRIOR WRITTEN APPROVAL of an officer of AguaSeal Acquisition, LLC.

6. The solar reflectance of this roofing product may decrease over time due to environmental defacement such as dirt, biological growth, ponded water, etc. The roof should be monitored at regular intervals and maintained or cleaned when necessary to assure maximum solar reflectance.

1.9 DELIVERY, STORAGE, AND HANDLING

1. Deliver materials to site in manufacturer's unopened and undamaged containers bearing the following information:

    1. Name of manufacturer
    2. Name of contents and products code
    3. Net volume of contents
    4. Lot or batch number
    5. Storage temperature limits
    6. Shelf-life expiration date
    7. Mixing instructions and proportions of content
    8. Safety information and instructions

2. Store materials in accordance with AguaSeal instructions. **It is essential that the product be protected from the elements to preserve its integrity.** Contact the AguaSeal Technical Sales Representative for guidance.

3. Store materials at temperatures between 40 - 90 degrees F (4 - 32 degrees C). Keep out of direct sunlight.

4. Support stored material containers on pallets or otherwise off the potentially wet ground as necessary.

5. Handle materials in accordance with the manufacturer's recommendations.

1.10 ENVIRONMENTAL REQUIREMENTS

The MonoSeal System should only be applied if no rain is expected before the application has had time to dry and if ambient temperatures are 40F (4.5C) or above.

1.11 WARRANTY

MonoTop finish coating will be applied over a MonoBase and TRU™ underlayment foundation to build millage to warranty requirements.

The application rates vary with the warranty selected. The total system dry thickness will also vary based on the MonoBase coating used and the warranty selected. See section 3.3 for application and minimum dry thickness amounts.

In all options, the following are requirements for obtaining an AguaSeal Warranty.

0. Provide applicable timeframe AguaSeal material only or labor and material warranty (see Application, below).

1. The Contractor shall be responsible for an initial three years of labor warranty with AguaSeal being responsible for material only or both labor and material, subject to the specific agreement, from year four forward.

2. Manufacturer is responsible for the labor portion of the warranty from year four forward.

3. To qualify for any Agua-Seal Warranty, the system must comply with the following minimum dry film thickness where reinforcing TRU™ underlayment is used;

MonoSeal Membrane System - (reinforced Areas)	10 Year 20 Year	40 mils dry minimum 52 mils dry minimum.
MonoSeal Membrane System - (Not reinforced)	10 Year 20 Year	13 mils dry minimum 26 mils dry minimum

1.12 PROJECT CONDITIONS

A. Acceptable Substrates: Acceptable substrates for the MonoSeal System shall be any of the following: Commercial Standing Seam or similar metal panel roofs.

B. GC should conduct a roof scan on flat and low slope roofs of all types prior to commencement of any AguaSeal work, in order to comply with AguaSeal requirements.

C. Substrate: After existing roofing systems are cleaned and repaired by the system installer, as required, but prior to starting the membrane system

installation work, complete all substrate corrective actions required, including but not limited to; removal and replacement of deteriorated flashing, roof decking, removal and replacement of wet insulation. The substrate shall be smooth, dry, and free of debris.

PART 2 PRODUCTS

2.1 MANUFACTURER

1. AguaSeal Acquisitions, LLC
   7269 Cross Park Drive, North Charleston, SC 29418
   Phone: (843) 614 9663 www.aguaseal.com

2.2 MEMBRANE COMPOUND MATERIAL

2. Waterproofing Material:

   a) MonoSeal Membrane System, namely a water-based, TRU™ underlayment-reinforced, highly flexible acrylic coating system which is liquid-applied in three successive stages, creating one continuous and seamless watertight membrane, with a 40-mil minimum, dry, cured total system thickness;

      1.1 The MonoSeal System is comprised of:

         I. Appropriate Primers

         II. MonoBase: a blend of highly flexible, water-based, 100% pure, acrylic polymer, resin coatings.

         III. TRU™ underlayment: non-woven polyester, stitch-bonded, heat-set fabric.

         IV. MonoTop: an ultra-violet light resistant blend of highly flexible, water based, 100% pure, acrylic polymer, resin coatings

Reinforcing TRU™ underlayment: This material shall be non-woven 100% polyester, stitch-bonded, heat-set fabric, as specified by the Architect/Engineer;

a) 272: Weight: Minimum (2.73oz), Target (3.04oz), Maximum (3.34oz)

b) 272: Tensile Strength: MD: 67 lbs., CD: 59 lbs. per ASTM D5034

b) 272: Elongation @ Break: MD: 25%, CD: 79% per ASTM D5034

c) 272: Ball Burst: 109 lbs. per ASTM D3787

d) 272: Trapezoid: MD: 22 lbs., CD: 21 lbs. per ASTM D5587

e) 272: Thickness: 0.018 inches per ASTM D1777

2.3 **CURED CHARACTERISTICS**

PROPERTY	TEST	RESULT
Elongation	ASTM-D638	>300% Elastomeric
	ASTM-D2370	>220% @ Break
Tensile Strength (cured)	ASTM-D412	>2000 PSI (12,789 kPA)
	ASTM-D2370	>210 PSI
Density		12.1 lb./gal
Volume Solids	ASTM-D2697	> or = 50%
Weight Solids	ASTM-D1644	> or = 65%
Viscosity	ASTM D562	129 Krebs @ 77°F
Algae Resistance	ASTM-G29	No Growth Supported
Moisture Vapor	ASTM-D1653	3 perms
Tear Resisantace	ASTM-624	81 (Lbf/in)
Fire Rating	ASTM-E108	Class A
VOC (calculated)		< 72 g/L
Susceptibility to Leakage	FM-4470	
Windstorm Pressure	FM-4470	
Severe Hail Test	FM-4470	No Separation or Rupture 1 SH
Resistance to Foot Traffic	FM-4470	No Sign of Tearing or Cracking
Liquid Applied Acrylic	ASTM-D6083	Approved
Weathering	ASTM-G26	No effect after 3,000 hours
Salt Spray Test	ASTM-B117	No effect
Fire Rating	ASTM-E108	Class A
Low Temperature Flexibility (-15°F)	ASTM-D522	Pass
Liquid Applied Acrylic	ASTM-D6083	Approved
Solar Reflectance	ASTM-C1549	> or = 0.79
Thermal Emittance	ASTM-C1371	> or = 0.90

2.4 ACCESSORIES

A. Cant Strips: AguaSeal-approved cant strip systems are EPS (Expanded Polystyrene), ISO (Polyisocyanurate), and non-pressure treated lumber. Cant

strips should be installed at internal corners, around curbs, and at any 90-degree angles, all as recommended by the Technical Sales Representative.

B. Retrofit Internal Drains: Optional unless specified by AguaSeal Technical Representative. Retrofit roof drains are designed to replace existing drains in reroofing applications. Installed from the roof surface, retrofit drains are engineered to be installed without removing the existing plumbing or fixture while providing a watertight connection to the roof system and the existing plumbing.

C. AguaBase Below Grade (BG): AguaBase BG may be made into a trowel grade acrylic, cementitious, moderately flexible, and elastomeric bulking material by increasing the Portland #1 Cement or sand in the AguaBase BG mix process. It is used in conjunction with AguaBase BG or MonoBase to fill cracks, voids, or low depressions on various substrates, repair existing delaminated roofing, and provide a harder, more durable, and ponding water tolerant surface around roof drains and scuppers.

D. PanelSeal Metal Primer: Water-based primer used to encapsulate existing rust, stabilize and protect metal surfaces.

E. AguaGrip: AguaGrip is a low viscosity primer adhesive providing excellent adhesion to virtually all roof substrates. It can be used to seal chalky residue substrates, re-adhere loose granules on a cap sheet, to encapsulate difficult-to-remove dust and dirt. AguaGrip makes an excellent bleed-blocker and aid system for leveling surfaces such as old built-up, granulated modified bitumen, and other, ballasted roofing substrates, making them ready for application of any of the MonoSeal System. In addition to the above-mentioned substrates, AguaGrip can be used effectively to seal virtually all surfaces, including asphalt, concrete, asbestos, cement roofing, plastisol-coated metal, and other pre-coated surfaces.

F. AguaPath: a hardwearing, flexible, and durable water-based, coating for the protection of walkways and pedestrian areas on various roofing substrates. Contact the AguaSeal TSR for suitability of purpose subject to the substrate.

G. 299SRW Roof Wash: Used for roofs that have previously been coated with aluminum coating. This product is used to remove the aluminum coating from the existing roof allowing the MonoSeal System to adhere properly. Product is diluted on the jobsite with 2 parts water and applied prior to pressure washing. Ensure that the treated area remains wet with the 299SRW for a minimum of 15 minutes before pressure washing begins.

PART 3 EXECUTION

3.1 EXAMINATION

1. Ensure the substrate surfaces are clean and dry, free of loose particles, cracks, pits, projections, or otherwise anything that may prevent adhesion or the successful application of the waterproofing system.

2. Ensure any penetrations through the substrate to be treated are securely installed.

3. Ensure that substrate areas are adequately supported and firmly fastened in place.

4. Ensure the roof substrate has a minimum slope of 0.25" per foot.

5. Ensure the roof substrate is free of any ponding water depressions. In the case of such depressions, AguaBase BG Trowel Grade may be used to level out the substrate. Allow to dry before any further product application. In the case of larger areas of ponding water probability, AguaBase BG, TRU™ underlayment, AguaBase BG, and another coat of AguaBase BG should be applied over the MonoBase application in that specific area.

6. Ensure all attached parapet/vertical walls are properly treated with the MonoSeal System.

3.2 PREPARATION

1. Protect adjacent surfaces not designated to receive waterproofing.

2. Remove lightning protection.

3. Roofs with Aluminum Coating- Apply 299SRW Roof Wash at a dilution rate of 1 part product to two parts water. Ensure that the applied cleaner remains wet for a minimum of 15 minutes prior to pressure washing.

4. Clean and prepare surfaces to receive waterproofing treatment by removing all loose and flaking particles, grease and any growing organic materials by power wash (3000 psi) and a stiff bristle push broom. Extreme care should be taken not to inject water into the substrate during washing. In some cases, additional drying time may be required after the cleaning process. Please consult your AguaSeal Technical Sales Representative for additional advice on cleaning various roofing substrates.

5. Following power washing, ensure that any remaining loosely adhering residue of previous coatings is removed to facilitate good adhesion.

6. Make any repairs required to the existing substrate. In areas where the existing roofing system is not fully adhered:

   a) Remove any non-adhering roofing.
   b) Tighten all existing loose fasteners or replace them with “oversized” roofing fasteners. Replace all missing fasteners.

7. Do not apply any AguaSeal treatment to any surfaces deemed unacceptable to the TSR.

3.3 APPLICATION

3.3.1 Surface Primers - As necessary, apply one of the following primers at the proper coverage rates. Contact AguaSeal TSR to verify if a primer is required

AguaGrip - Apply AguaGrip at a minimum of 140 square feet per gallon.

PanelSeal Metal Primer- Apply Panel Seal Metal Primer to opacity (approximately 200 square feet per gallon to any/all rusted metal areas designated to receive waterproofing treatment.

3.3.2 MonoBase Application with TRU™ underlayment

4. Apply project-specific size TRU™ underlayment, laid into the wet MonoBase coating, and immediately saturate the top of TRU™ underlayment with an additional coat of MonoBase. Care should be given to ensure that adjacent runs of TRU™ underlayment are overlapped a minimum of 4 inches.

5. Vertical Seams- Unless specified by the AguaSeal Technical Representative, Vertical standing seams are NOT flashed with 6” TRU™ underlayment.

6. Horizontal Laps- Using MonoBase and 12” TRU™ underlayment, waterproof all horizontal laps being careful not to create “fish mouths”.

7. Additional Fasteners- Using either MonoMastic or 6” square pieces of TRU™ underlayment MonoBase, waterproof any remaining fasteners not previously waterproofed.

8. Parapet or Adjoining Vertical Walls - Using MonoBase and project-specific sized TRU™ underlayment (12”) waterproof the junction between the horizontal roof plain and any vertical walls. Continue the treatment up vertical surfaces and onto the roof field a minimum of 6 inches in each direction.

9. Roof Penetrations - Use MonoBase and project-specific sized TRU™ underlayment seal around the base of the penetration, extending at least 6 inches onto the vertical and 6 inches onto the roof field ensuring watertight integrity. Cut flashing to accommodate the shape of the penetration. Both the top and bottom of neoprene pipe boots shall be flashed in a similar fashion.

10. Roof Drains - Remove drain rings and use MonoBase and project-specific sized TRU™ underlayment and seal the roof drains, extending into the bowl of the drain.

AguaSeal recommends modifying the existing internal drain with the addition of a retrofit drain assembly. Should retrofit drains be installed, the process should take place prior to the roof being cleaned and before the MonoBase system is applied.

a. Scuppers - Using MonoBase and project-specific sized TRU™ underlayment, waterproof and seal scuppers by extending the chosen system beyond the existing roofing system into and through the scupper.

b. Wall flashings and Coping caps - using MonoBase and project-specific size TRU™ underlayment seal any seams and fasteners penetrating through wall flashings and coping caps.

c. Skylights: Curb skylights shall be treated in the same fashion as curb flashings. The entire perimeter shall be flashed with MonoBase and a minimum 6 inches width of TRU™ underlayment. All exposed skylight fasteners shall be encapsulated with MonoBase and 6”x6” TRU Underlayment as necessary. Fiberglass skylights may be treated with AguaGrip CLEAR to preserve and lock down fibers. DO NOT COAT OVER SKYLIGHTS WITH ANY NON-CLEAR COATING.

3.3.4 **MonoTop Application**

10-year Warranty Requirements: Brush, spray or roller apply MonoTop at a total coverage rate of 1.5 gallons per 100 square feet. To achieve this milage, AguaSeal recommends two coats applied at .75 gallons per 100 square feet per coat. Allow coats to dry between application.

Total system dry thickness-	**Reinforced areas =**	**40 mils Min.**
	Non-reinforced areas=	**13 mils Min.**

20-year Warranty Requirements: Brush, spray or roller apply MonoTop at a coverage rate of 3 gallons per 100 square feet. To achieve this milage, AguaSeal recommends three coats applied at 1 gallon per 100 square feet per coat. Allow coats to dry between applications.

Total system dry thickness-	**Reinforced areas =**	**52 mils Min.**
	Non-reinforced areas=	**26 mils Min.**

PROTECTION OF FINISHED WORK

3.3.5 Monitor the finished system for 7 days, sweeping any ponding water from the roof surface off to allow for full cure.

3.3.6 Verify final film thickness as specified. If the specified dry film thickness has not been achieved, application of additional coating will be required.

3.3.7 Visually inspect critical areas of the roof including roof seams and penetrations and touch up with additional MonoTop to insure complete and adequate coverage.

3.3.8 Protect completed membrane from damage by work of other trades. Schedule a sequence of work so that traffic over the new membrane is minimized. Institute required procedures for the protection of the completed membrane during installation of work from other trades throughout the remainder of the construction period. Do not allow traffic of any type on the unprotected membrane.

3.3.9 At the completion of construction activities of other trades, touch up and restore damaged or defaced coated surfaces, if and where needed. Correct damage by cleaning, repairing, replacing, and/or recoating to make it acceptable to the specifier and/or AguaSeal. Leave in an undamaged condition.

3.4 INSPECTION INFORMATION

Inspect Preliminary Work / Flashing Details for problem areas (e.g., gaps, cracks, fish mouths, air pockets, etc.) to ensure that work is complete and satisfactory.

PART IV ANNUAL MAINTENANCE PROGRAM

The following are the recommendations for maintaining an AguaSeal Acquisition, LLC MonoSeal Roof System. If you have any questions, please contact our corporate office at 843-614-9663 or your Technical Sales Representative.

3.4.4 AguaSeal recommends that the roof area be inspected at least once per quarter

3.4.5 During the annual maintenance program, remove all debris from the roof surface, including any vegetation, dirt, loose nails and screws, unused equipment, etc.

3.4.6 Inspect the entire roof surface for any ponding water areas. If ponding is occurring, then contact AguaSeal Corporate or your Technical Sales Representative who will recommend an approved AguaSeal applicator to remove and correct the problem area.

3.4.7 Inspect the roof surface for any punctures, especially around exhaust vents and HVAC units. Should any punctures be found, then contact AguaSeal Corporate or your Technical Sales Representative who will recommend an approved AguaSeal applicator for repair work.

3.4.8 Keep all gutters free of debris. Make sure that the downspouts are draining properly by water testing them.

3.4.9 Trim back any overhanging tree branches.

3.4.10 Check all caulking and sealants on flashings and copings. Scrape and remove any caulking that is weather cracked and damaged. Clean the area thoroughly using a wire brush if necessary. Reapply polyurethane caulking such Vulkem, NP-1, or equivalent.

3.4.11 Check the mortar on chimneys and parapet walls, both in between the brick and on top. If it is damaged or deteriorating, have it tuck-pointed. Any mason can perform this work.

3.4.12 An AguaSeal roof should be cleaned at least once a year (not required) to remove surface debris build-up for improved reflectivity and cool roof benefits. Use a soft bristle wash brush and a mild detergent to remove build-up. Rinse thoroughly to remove detergents. DO NOT POWERWASH.

END