

Application Specification:

SI-30-GF20
May 2016
Supersedes 8/14

DIVISION: 07 57 00
**30 MIL GACOFLEX S20 SERIES SOLVENT-FREE SILICONE ELASTOMERIC COATING
SYSTEM OVER SEAMLESS SPRAYED IN PLACE
POLYURETHANE FOAM INSULATION**

1.1 SUMMARY

NOTE TO ARCHITECTS AND ENGINEERS: This specification provides for a fire resistant roof covering system which meets Class A, non-combustible deck requirements under ASTM E-108 Class "A". Suitable substrates include concrete, gypsum board, metal and certain heavy wood decks. For re-roofing over BUR or other roof coverings, including single ply membranes and modified bitumen systems, applied according to this specification will not alter the existing fire resistance rating. Surfaces to receive the roof covering system must comply with applicable building codes.

Sprayed in place polyurethane foam is applied at a desired thickness (1" (2.54 cm) minimum)) to fulfill thermal insulation requirements and to provide seamless monolithic surface over a variety of roof designs, shapes and draining slopes.

When properly applied, the Gaco Flex S-20 Series Silicone Coating System provides a weatherproof seal that protects the polyurethane foam from degradation caused by ultra violet light, water and other normal weathering hazards. This application incorporates the optional application of granules. The thickness of the foam insulation can be varied to provide a desired thickness to create a positive slope to the drain. The appearance of the system depends on the finished surface of the polyurethane foam insulation which normally has slight undulations in thickness. Sprayed-in-place polyurethane foam mirrors the contour of the substrate and will reflect projections and depressions.

The Gaco Flex S-20 Series Silicone Coating System discussed in this specification has a moderate rate of water vapor transmission and is not recommended for use on cold storage or cryogenic structures. Such structures may have constant high water vapor drive causing long-term accumulation of moisture in the insulation. Consult Gaco Western for vapor retardant systems to use on refrigerated structures.

This specification is intended only as a guide for the development of a project specification. The suitability of this specification for a particular project must be determined by a qualified representative of the owner.

Elements of this specification may require modification in order to clearly delineate project requirements. Sections that are not pertinent may be deleted.

1.2 RELATED SECTIONS

A. Cast-In-Place Concrete:	Division 03 30 00	F. Vapor barriers/air barriers:	Division 07 25 00
B. Flashing/Sheet Metal:	Division 07 60 00	G. Board Insulation:	Division 07 22 00
C. Roof Accessories:	Division 07 72 00	H. Skylights:	Division 08 60 00
D. Rough Carpentry/wood blocking	Division 06 10 00	I. Metal decking	Division 05 30 00
E. Drains, vents, penetrations	Division 07 72 00		

1.3 SUBMITTALS

- A. Product Data: Submit the manufacturer's standard submittal package including specification, installation instructions, and general information for each waterproofing material.
- B. Submitted Material Warranty must be supplied by product manufacturer.
- C. Applicator Qualifications: Submit current "Qualified Applicator" Certificate from the specified waterproofing manufacturer.
- D. Sample: Two physical samples reflecting the completed installation, i.e. finish, color, must be submitted to the owner/owners representative. Size of these samples shall be 12" X 12" (30.48 cm x 30.48 cm) minimum.
- E. Substrate Conditions:
 - 1. Manufacturer's representative will present to the owner a completed inspection form verifying the substrate condition and any noted defects not specifically addressed in regard to this installation.
 - 2. The surface shall be free from loose dirt, stone, debris, moisture, and shall be in stable condition. Any work on the area to receive this application shall be completed prior to the installation.
 - 3. The applicator shall complete a substrate inspection prior to start of the roofing. The architect/owner and applicator shall accept the surface. Start of the work constitutes acceptance.

1.4 QUALIFICATIONS

- A. The primary polyurethane foam insulation and the designated elastomeric coating system shall be of:
 - 1. Single manufacturer. The manufacturer shall have a minimum of 10 years experience in the manufacture of materials of this type.
 - 2. Applicators shall have a minimum of 5 years experience in the application of waterproofing materials of the type specified. Applicator shall possess a current "Qualified Applicator" Certificate from the specified waterproofing manufacturer.
- B. Pre-Bid Conference: 10 working days prior to the bid opening there is to be a mandatory Pre-Bid Conference. Anyone not attending the Pre-Bid Conference will not be allowed to bid the project. All products considered an equal to the specified product or any changes in the scope of work installation or specifications must be presented at the Pre-Bid Conference. If a change in the specifications is accepted, it will be considered as an alternate and will be presented as a bid amendment issued 5 working days prior to the bid opening. No other changes to the specification or bid documents will be accepted.
- C. Materials other than those specified shall be submitted to the architect/owner for approval no later than ten days prior to the bid date. In requesting prior approval, it shall be necessary to submit:
 - 1. A letter of certification, signed by an officer of the manufacturer, stating that the alternative material is equal to or better than the specified product.
 - 2. Independent laboratory test data giving physical property values in comparison to the specified material.
- D. Pre-Installation Conference: Just prior to the commencement of the installation, meet at the job site with a representative of the coating manufacturer, waterproofing contractor, general contractor, architect and other parties affected by this section. Review methods and procedures, substrate conditions, scheduling and safety.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver all materials in sufficient quantities as not to cause delays in the application of the roofing system. Owner/owner's representative shall reject damaged materials not conforming. Rejected materials shall be removed immediately from the job site and replaced at no additional cost to the owner.

- B. Store materials as recommended by the manufacturer and conforming to applicable safety regulatory agencies: town, state, and federal. Refer to all applicable data including, but not limited to MSDS's, Product Data Sheets, product labels and specific instructions for personal protection.
- C. Provide adequate ventilation, protection from hazardous fumes, overspray potential to workers and associated trades in close proximity of the application.

1.6 ENVIRONMENTAL REQUIREMENTS

Proceed with the work of this section only when the existing and forecasted weather conditions will permit the application to be performed in accordance with the manufacturer's recommendations.

- A. **Do not** install polyurethane foam insulation under the following conditions:
 - 1. When the surface temperature is below 50°F (10° C) or is above 160°F (71° C).
 - 2. When the relative humidity is above 80% or temperature is within 5°F of the dew point.
 - 3. When the wind velocity exceeds 15 mph (24 kph)
(Without the use of a wind screen)

1.7 WARRANTY

- A. The contractor shall guarantee that all work performed under this section will be free from defects in material and workmanship. Upon notice of a defect in writing to the contractor within one year after completion of the work, the contractor shall, at his own expense, make the necessary repair or replacement of the defective work.
- B. Warranty must be supplied by product manufacturer
- C. A warranty is available with this system provided it has been installed by a Gaco Western Qualified Applicator and is installed according to this specification .An application for Warranty must be made prior to starting the job.
- D. Protection of building and occupants:
 - 1. All surfaces not to receive the system specified shall be protected from overspray hazard i.e. windows, doors, exterior and vehicles. Protective coverings shall be secured against wind and shall be vented if used in conjunction with the application preventing collection and moisture.
 - 2. The contractor is to post signs noting a potential overspray hazard within 400' (121.90 m) of the application.
 - 3. All air intake ventilation equipment shall be turned off to prevent fumes from entering the building.
 - 4. All surfaces damaged during the application shall be restored at no expense to the owner.
 - 5. No smoking signs are be posted as mandated by local fire officials.
- E. Substrate: Proceed with the work as specified only after the substrate construction, preparation, and detail work has been completed.
- F. Equipment: All equipment used during the operations shall be located so as not to adversely effect the daily operations or endanger occupants, structure or materials on-site. All spray equipment must be grounded during the operations.

PART 2 - PRODUCTS

2.1 MANUFACTURER

Acceptable Manufacturers:
Gaco Western, LLC www.gaco.com, 800-456-4226

2.2 MATERIALS

- A. Cleaner: GacoFlex GacoWash Concentrated Cleaner
- B. Primer: GacoFlex E-5320 Epoxy Primer.
- C. Polyurethane foam insulation shall be designed for a spray application resulting in high quality, rigid polyurethane under the prevailing application conditions. Polyurethane foam shall be of the proper formulation to meet climatic conditions at the time of the application.
1. Polyurethane foam insulation shall be Gaco RoofFoam 273 or 2733 manufactured by Gaco Western meeting the following minimum physical and performance properties.

Gaco RoofFoam 273 or 2733

<u>Property</u>	<u>Value</u>	<u>Test Method</u>
Nominal Density	2.5/3.0 lbs/ft ³	ASTM 1622-93
Closed Cells	94.3 %	ASTM D-2856 C-94
Compressive	50.1 psi	ASTM D-1621
R Value	6.5 per Inch	ASTM C-518

NOTE: It is Gaco Western's position that the use of foamed plastic insulation for interior application on walls or ceilings may represent an unreasonable fire hazard unless the foamed plastic insulation is covered with a thermal barrier and that the resulting composite construction has a minimum 15 minute rating as listed by Factory Mutual Research Corporation or other equally accepted listing agency.

Fire rated coating systems for plastic foam insulation tested under ASTM E-108 Class "A" Roof Composite Construction do not qualify for thermal barrier use on interior walls and ceilings.

- D. Expansion Joint Covers: Where called for on the drawings, expansion joint covers will be GacoFlex NF-621 Neoprene Sheet, 1/16" (.16 cm) thick, using GacoFlex N-1207 Neoprene Adhesive, in a width of _____ (to be stated in the published specification. If there is none stated, the bids will be based on 12" (30.48 cm) Apply in accordance with Gaco Western's General Instructions GW-5-D3 Details.
- E. Elastomeric Coating:
Gaco Western GacoFlex S-20 Series Silicone Coating with the following physical properties:

<u>Property</u>	<u>Value</u>	<u>Test Method</u>
Tensile Strength	550 psi	ASTM D-412
Elongation	150%	ASTM D-412
Tear Resistance	21 ply	ASTM D-624
Hardness	55 Shore A	ASTM D-2240
Water Vapor Permeability	5.3 perms	ASTM E-96
	Procedure B at 0.5 mm (20 mils) thickness \pm 10%	
	Minimum permeance requirement is 2.5 U.S. perms	
Volume Solids	95% \pm 1%	Calculated
Reflectance	0.88	ASTM C-1549
		S-2000 White
Emittance	0.87	ASTM C-1371
		S-2000 White

- F. Flashing: Gaco Western RoofFoam 273 or 2733 can be self-flashing at curbs, parapets, walls and penetrations. Contact a Gaco Western Representative for assistance.

Flashing at dynamically moving joints require GacoFlex NF-621 Field Curing Neoprene Sheet Flashing 1/16" (.16 cm) and GacoFlex N-1207 Neoprene Adhesive.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that the substrate is ready to receive the work; surface is clean, dry and free of substances which could affect the bond.
- B. Cleaning of the roof should be accomplished by using power vacuum equipment, power sweepers, air blowers, power washers or other suitable means. Use GacoWash diluted 1 part of GacoWash with 9 parts of water when power washing.
- C. All associated construction (i.e. drain installation, edge flashing, penetrations and mechanical apparatus) shall be completed prior to the commencement of the specified roofing system.
- D. Verify that all other work involved with this area, done under other sections, has been completed and accepted by the architect and general contractor prior to starting the waterproofing application.

3.2 PREPARATION

- A. Clean substrate to remove all oils and surface contaminants. Refer to Gaco Western's General Instructions GW-1-1, Surface Preparation.
- B. Mask off all adjoining areas that will not receive the roofing system.

3.3 INSTALLATION

- A. Technical Advice: The installation of this roofing system shall be accomplished in the presence of, or with the advice of the manufacturer's technical representative. Contact the nearest regional office for assistance.

Note: Surface should be clean and dry, remove all oils and other surface containments.

- B. Primer: No primer system is required unless rust is present. Area the contain Rust: Apply GacoFlex E-5320 Primer at one gallon per 300 square feet (3.78 L / 27.9 m²) to steel, aluminum, copper and ferrous metal. The primer must be completely dry before starting the polyurethane foam application.
- C. Foam: Install GacoRoofFoam 273 or 2733 in a thickness of _____ ± 1/4" (.64 cm), (1" (2.54 cm) minimum required.) Neatly terminate the sprayed-in-place polyurethane foam on all vertical surfaces, (i.e. pipe penetrations, vents, mechanical equipment, parapet walls, etc.) a minimum of 3" (7.62 cm) or 2½ times as specified minimum foam thickness.

Example: If 1" (2.54 cm) minimum is specified, all vertical terminations shall have a minimum of 2 ½" (6.35 cm) sprayed up onto the vertical surface and canted to the horizontal surface.

1. The polyurethane foam spray application shall be limited to an area which can be completed to full foam thickness in one day.
 2. The completed polyurethane foam surface shall be smooth to an orange peel texture; a popcorn texture is not acceptable.
 3. The completed polyurethane foam surface shall be free of pinholes and "glass windows" due to improper equipment calibration or climatic conditions.
 4. Apply the protective coating to the polyurethane foam surface on the same day (2 hours minimum).
- D. Elastomeric Top Coat: Apply one coat of GacoFlex S-20 Series Silicone Coating at a coverage rate of 2 gallon per 100 square feet (5.68 L / 9.3 m²) to achieve a nominal film thickness of 30 dry mils. Double coat flashings and edge terminations.

Optional 2 Coat Application:

1. Base Coat: Apply GacoFlex S-20 Silicone Series at the rate of 1 gallon per 100 sq. ft. (2.84 L / 9.3 m²). At all edges and penetrations, an extra pass must be applied. Dry film thickness shall be a minimum of 15 mils.
2. Top Coat: Apply GacoFlex S-20 Silicone Series at the rate of 1 gallon per 100 square feet (2.84 L / 9.3 m²). Coat all surfaces including expansion joint covers and flashing. At all edges and penetrations, an extra pass must be applied. Dry film thickness shall be a minimum of 15 mils.

NOTE: The base coat shall be allowed to cure a minimum of 2 to 6 hours. For best results, apply at temperatures above 50°F. (10°C) to a dry, frost free surface. The surface must be dry, clean & free of debris between coats.

NOTE: The topcoat must completely cover the base coat (the base coat must be an alternate color from the top coat) including expansion joint covers and flashing. The contractor should figure a 10% loss due to overspray, foam texture and wind.

NOTE: The base coat must cover all surfaces completely extending at least 2" (5.08 cm) beyond the polyurethane foam on vertical terminations. An extra pass of base coat material is required at all edges and penetrations if GacoFlex NF-621 Neoprene Sheet Flashing is not used.

- E. Optional Granular Coat: An additional granular coat may be added. Apply one coat of GacoFlex S-20 Series Silicone Coating at the rate of not less than .5 gallon per 100 square feet (1.89 L / 9.3m²), (8 mils dry (.20 mm)). Immediately broadcast roofing granules into the finish coat at the rate of 30 lbs per 100 square feet. (13.6 kg / 9.3m²).
- F. Optional WalkPad: Apply one coat of GacoFlex WalkPad SF-2036 at a rate of 4 gallons per 100 sq. ft. (64 wet mils); Broadcast GacoFlex WalkPad safety yellow granules into wet coating at a rate of 0.5 lb. per 100 square feet to help ensure good traction.

NOTE: Tape off area to receive the GacoFlex WalkPad area using duct tape. After application remove duct tape while coating is still wet.

NOTE: GacoFlex WalkPad SF-2036 is the only walk pad system approved for use with GacoFlex coating systems

Caution: While the use of granules will improve traction, caution should still be exercised when walking on GacoFlex WalkPad, especially in wet conditions.

NOTE: No traffic shall be permitted on the coated surface for a minimum of 3 days. Damage to the surface by other trades shall not be the responsibility of the roofing contractor.

3.4 FIELD QUALITY CONTROL

- A. The contractor shall maintain the system to verify compliance with this specification.
1. Thickness of polyurethane foam and applied coating shall be measured and recorded for each coat and the total protective coating system.
- B. The owner's representative has the option of taking core samples to verify compliance with the specification.
1. Cut out sections shall be immediately repaired by the contractor at his cost.
 2. All costs of testing the core samples shall be paid for by the owner.
- C. Any variations from the specified limits found by the contractor or owner's representative shall be corrected by the contractor.
- D. Dry Film Thickness: The total dry mil thickness of the coating, without the granular coat, shall measure a minimum of 30 dry mils. Rough foam which increases the surface area will require proportionate increases in the coating to maintain an average dry film thickness.