**SECTION 07 55 56**

**COLD-APPLIED PROTECTED MEMBRANE WATERPROOFING**

**COLPHENE LM BARR**

*NOTE: This guide specification is provided as a guideline and must be modified, as required, by the Designer of Record for each project. This specification is prepared in general accordance with CSI format to be included under Division 7 – Thermal and Moisture Protection. Additional information is provided. [delete this paragraph]*

*Optional information to consider is presented in “blue” font below. Choose appropriate options and delete any information deemed appropriate for each individual project. [delete this paragraph]*

1. **GENERAL**
	1. SUMMARY
		1. Work shall include, but is not limited to, the materials, labor and related work to complete the following:
			1. Cleaning and preparing substrates to receive waterproofing.
			2. COLPHENE LM BARR waterproofing, flashings and sealants:
				1. Horizontal and vertical waterproofing, reinforced:

Base layer of 60/90 wet mils (3.7 gal/square/5.6 gal/square) of COLPHENE LM BARR.

POLYFLEECE reinforcement

Top layer of 60/90 wet mils (3.7 gal/square/5.5 gal/square) of COLPHENE LM BARR.

Total of 120/180 wet mils (7.4 gal/square/11.0 gal/square) of COLPHENE LM BARR plus the fully encapsulated POLYFLEECE reinforcement.

* + - * 1. Waterproofing flashings, reinforced:

Install reinforced COLPHENE LM BARR flashings where specified and as shown on drawings.

* + - 1. Protection course and related accessories as specified and shown on drawings.
		1. Provide all related work to receive the specified manufacturer’s 20/30 year waterproofing warranty for the fully reinforced COLPHENE LM BARR applied at 120/180 wet mils.
	1. RELATED SECTIONS:
		1. 010000 - General Requirements
		2. 011000 - Summary of Work
	2. REFERENCES
		1. AMERICAN CONCRETE INSTITUTE (ACI).
			1. ACI 301, Specifications for Structural Concrete.
			2. ACI 308, Specification for Curing Concrete.
		2. AMERICAN SOCIETY OF CIVIL ENGINEERS, Reference Document ASCE 7, Minimum Design Loads for Buildings and Other Structures.
		3. ASTM INTERNATIONAL STANDARDS.
			1. ASTM C472, Standard Test Methods for Physical Testing of Gypsum, Gypsum Plasters and Gypsum Concrete.
			2. ASTM C717, Standard Terminology of Building Seals and Sealants.
			3. ASTM C794, Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants.
			4. ASTM C 836, Standard Specification for High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course.
			5. ASTM C920, Standard Specification for Elastomeric Joint Sealants.
			6. ASTM C1193, Standard Guide for Use of Joint Sealants
			7. ASTM C1250, Standard Test Method for Nonvolatile Content of Cold Liquid-Applied Elastomeric Waterproofing Membranes.
			8. ASTM C1305, Standard Test Method for Crack Bridging Ability of Liquid-Applied Waterproofing Membrane.
			9. ASTM C1330, Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants.
			10. ASTM C1375, Standard Guide for Substrates Used in Testing Building Seals and Sealants.
			11. ASTM C1522, Standard Test Method for Extensibility After Heat Aging of Cold Liquid-Applied Elastomeric Waterproofing Membranes.
			12. ASTM D412, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers, Tension.
			13. ASTM D816, Standard Test Methods for Rubber Cements.
			14. ASTM D994, Standard Specification for Preformed Expansion Joint Filler for Concrete.
			15. ASTM D1002, Standard Test Method for Apparent Shear Strength of Single-Lap-Joint Adhesively Bonded Metal Specimens by Tension Loading.
			16. ASTM D1203, Standard Test Methods for Volatile Loss From Plastics Using Activated Carbon Methods.
			17. ASTM D1204, Standard Test Method for Linear Dimensional Changes of Nonrigid Thermoplastic Sheeting or Film at Elevated Temperature.
			18. ASTM D1475, Standard Test Method For Density of Liquid Coatings, Inks, and Related Products.
			19. ASTM D2240, Standard Test Method for Rubber Property, Durometer Hardness.
			20. ASTM D2939, Standard Test Methods for Emulsified Bitumens Used as Protective Coatings.
			21. ASTM D2983, Standard Test Method for Low-Temperature Viscosity of Automatic Transmission Fluids, Hydraulic Fluids, and Lubricants using a Rotational Viscometer.
			22. ASTM D4258, Standard Practice for Surface Cleaning Concrete for Coatings.
			23. ASTM D4833, Standard Test Method for Index Puncture Resistance of Geomembranes and Related Products.
			24. ASTM D5147, Standard Test Methods for Sampling and Testing Modified Bituminous Sheet Material.
			25. ASTM D5249, Standard Specification for Backer Material for Use with Cold and Hot Applied Joint Sealants in Portland-Cement Concrete and Asphalt Joints.
			26. ASTM D5295, Standard Guide for Preparation of Concrete Surfaces for Adhered (Bonded) Membrane Waterproofing Systems.
			27. ASTM D5957, Standard Guide for Flood Testing Horizontal Waterproofing Installations.
			28. ASTM D6163, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fiber Reinforcements.
			29. ASTM E96, Test Methods of Water Vapor Transmission of Materials.
			30. ASTM E154, Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.
			31. ASTM F2170, Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.
		4. AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)::
			1. ANSI/FM 4474, American National Standard for Evaluating the Simulated Wind Resistance of Roof Assemblies Using Static Positive and/or Negative Differential Pressures.
		5. INTERNATIONAL CONCRETE REPAIR INSTITUTE (ICRI)
		6. INTERNATIONAL CODE COUNCIL-EVALUATION SERVICES (ICC-ES)
			1. ICC-ES AC29, Acceptance Criteria for Cold, Liquid-Applied, Below-Grade, Exterior Dampproofing and Waterproofing Materials
		7. UNDERWRITERS LABORATORIES (UL)
			1. UL 790 Standard Test Methods for Fire Tests of Roof Coverings.
	3. SUBMITTALS
		1. Product Data Sheets:
			1. Submit manufacturer’s product data sheets, installation instructions and/or general requirements for each component.
		2. Safety Data Sheets:
			1. Submit manufacturer’s Safety Data Sheets (SDS) for each component.
		3. Sample/Specimen Warranty:
			1. Submit specimen copy of manufacturer’s warranty and contractor’s warranty.
		4. Shop Drawings:
			1. Submit waterproofing system detail drawings.
	4. CLOSEOUT SUBMITTALS:
		+ 1. Warranties: Provide manufacturer’s and contractor’s warranties upon project completion.
			2. Waterproofing membrane integrity test report: Provide test report from qualified Electric Conductivity Testing service stating findings of leak testing.
	5. QUALITY ASSURANCE
		1. MANUFACTURER QUALIFICATIONS:
			1. Manufacture shall have 10 years of history manufacturing below grade waterproofing materials in the US.
			2. Manufacturer shall have trained technical service representatives employed by the manufacturer, independent of sales.
		2. CONTRACTOR QUALIFICATIONS:
			1. Contractor shall be authorized by the manufacturer to install specified materials prior to the bidding period through satisfactory project completion.
			2. Applicators shall have completed projects of similar scope using similar waterproofing materials as specified herein.
			3. Contractor shall provide full time, on-site superintendent or foreman experienced with the application of waterproofing.
			4. Applicators shall be skilled in the application methods of waterproofing materials.
			5. Contractor shall maintain a daily record, on-site, documenting material installation and related project conditions.
			6. Contractor shall maintain a copy of all submittal documents, on-site, available at all times for reference.
	6. DELIVERY, STORAGE AND HANDLING
		1. Refer to each product data sheet or other published literature for specific requirements.
		2. Refer to product Safety Data Sheets (SDS) for storage and handling related hazards, and take all necessary measures and precautions to comply with storage and handling requirements.
		3. Deliver materials and store them in their unopened, original packaging, bearing the manufacturer's name, related standards, and any other specification or reference accepted as standard.
		4. Store materials in a dry, well ventilated, weather tight area, at 70°F (21°C). Protect materials to prevent damages due to environmental exposures.
		5. Properly store and dispose of materials in accordance with building owner requirements, site conditions, and the requirements of local jurisdictions.
		6. All damaged and deficient materials shall be removed from job site and replaced with new, suitable materials as specified.
	7. PERFORMANCE REQUIREMENTS
		1. MATERIAL PROPERTIES
			1. ICC-ES, AC29, Acceptance Criteria for Cold, Liquid-Applied, Below-Grade, Exterior Dampproofing and Waterproofing Materials:
				1. Products shall be tested to meet or exceed properties required by ICC-ES AC29.
			2. ASTM C836, Standard Specification for High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course.
				1. Products shall be tested to meet or exceed specified properties.
		2. WIND UPLIFT PERFORMANCE
			1. Performance testing shall be in accordance with ANSI/FM 4474.
			2. System Design Pressures: Calculated in accordance with ASCE 7, or applicable standard, for the specified roof system securement requirements.
		3. FIRE CLASSIFICATION:
			1. Assembly shall comply with UL 790, as listed with Underwriters Laboratory.
				1. Meets requirements of UL Class A.
	8. SITE CONDITIONS
		1. SAFETY:
			1. The contractor shall be responsible for complying with all project-related health, safety and environmental requirements.
			2. The contractor shall refer to product Safety Data Sheets (SDS) for health, safety, and environment related hazards, and take all necessary measures and precautions to comply with exposure requirements.
		2. ENVIRONMENTAL CONDITIONS:
			1. Monitor substrate and material temperature, as well as all environmental conditions such as ambient temperature, moisture, sun, cloud cover, wind, humidity, and shade.
			2. Ensure conditions are satisfactory to begin work and ensure conditions remain satisfactory during the installation of specified materials. Materials and methods shall be adjusted as necessary to accommodate varying project conditions. Materials shall not be installed when conditions are unacceptable to achieve the specified results.
			3. Precipitation and dew point: Monitor weather to ensure the project environment is dry before, and will remain dry during, the application of the specified materials. Ensure all materials and substrates remain above the dew point temperature as required to prevent condensation and maintain acceptable substrate conditions.
			4. Ambient temperature should be 35°F (2°C), and well above the dew point temperature, with no water, dew or condensation present on surfaces.
	9. WARRANTY
		1. Manufacturer's Warranty. The manufacturer shall provide the owner with the manufacturer’s [standard] [platinum], waterproofing warranty for [5][10]20][30] years from the date the warranty is issued.
1. **PRODUCTS**
	1. MANUFACTURER
		1. SINGLE SOURCE MANUFACTURER: All waterproofing materials shall be provided by a single material supplier.
			1. Comply with the manufacturer’s requirements as necessary to provide the specified warranty.
		2. ACCEPTABLE MANUFACTURERS:
			1. SOPREMA, located at: 310 Quadral Drive, Wadsworth, OH 44281; Tel: 800-356-3521; Tel: 330-334-0066; Website: www.soprema.us.
			2. CHEMLINK, located at: 353 E. Lyons Street, Schoolcraft, MI 49087; Tel: 800-826-1681; Tel: 269-679-4440; Website: www.Chemlink.com
			3. Acceptable alternate manufacturers: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	2. COLD-APPLIED WATERPROOFING
		1. WATERPROOFING:
			1. Single-component, cold-applied, moisture curing elastomeric waterproofing, brush, roller or squeegee grade, 5 gal pails.
				1. SOPREMA COLPHENE LM BARR

Grade/Type: Brush, roller or squeegee grade.

Viscosity, cP @ 73°F (23°C), per ASTM D2983: 275,000

Density, lbs/gal (g/mL), per ASTM D1475: 10.9 (1.31)

Tack-free time, minutes: 60

Shore A hardness, per ASTM C836 (ASTM D2240): 57

Weight loss, less than 20%, per ASTM C836 (ASTM C1250): Pass

Water vapor transmission, perm (ng/s.m2.Pa), per ASTM C836 (ASTM E96 (Method B)): 0.1 (5.7)

Film thickness, vertical, ≥ 60 mils+/-5 mils, per ASTM C836 (ASTM C1375): Pass

Adhesion in peel after water immersion, ≥ 1.0 lbf/in per ASTM C836 (ASTM C794): Pass

Low temperature crack bridging, no cracking, pass/fail per ASTM C836 (ASTM C1305): Pass

Extensibility after heat aging, no cracking, pass/fail per ASTM C836 (ASTM C1522): Pass

Service temperature range, degrees °F (°C): -40 to 200°F (-40 to 93°C)

Tensile Strength, lbf/in2 (kN/m2) per ASTM D412, Die C

94 (648) @ 378% elongation

Resistance to decay, < 10% change in weight loss per ICC-ES AC29, (ASTM E154): Pass

Hydrostatic Pressure over cracks, 50% of the lowest value achieved per ICC-ES AC29: Pass

Resistance to water, no blistering or re-emulsification per ASTM D2939, Section 15, Method A: Pass

* + - 1. Single-component, cold-applied, moisture curing elastomeric waterproofing, spray grade, 55 gal drums and 5 gal pails.
				1. SOPREMA Inc COLPHENE LM BARR

Grade/Type: Spray grade.

Viscosity, cP @ 73°F (23°C), per ASTM D2983: 35,000

Density, lbs/gal (g/mL), per ASTM D1475: 11.3 (1.35)

Tack-free time, minutes: 60

Shore A hardness, per ASTM C836 (ASTM D2240): 70

Weight loss, less than 20%, per ASTM C836 (ASTM C1250): Pass

Water vapor transmission, perm (ng/s.m2.Pa), per ASTM C836 (ASTM E96 (Method B)): 0.085 (4.9)

Film thickness, vertical, ≥ 60 mils+/-5 mils, per ASTM C836 (ASTM C1375): Pass

Adhesion in peel after water immersion, ≥ 1.0 lbf/in per ASTM C836 (ASTM C794): Pass

Low temperature crack bridging, no cracking, pass/fail per ASTM C836 (ASTM C1305): Pass

Extensibility after heat aging, no cracking, pass/fail per ASTM C836 (ASTM C1522): Pass

Service temperature range, degrees °F (°C): -40 to 200°F (-40 to 93°C)

* 1. ACCESSORIES
		1. FLASHING GRADE WATERPROOFING
			1. Single-component, cold-applied, moisture curing elastomeric waterproofing:
				1. COLPHENE BARR FLASHING:

Packaging: 20 oz sausage packs and 3.5 gal pails.

Viscosity, cP @ 73°F (23°C), per ASTM D2983: 1,000,000

Density, lbs/gal (g/mL), per ASTM D1475: 12.9 (1.55)

Tack-free time, minutes: 60

Shore A hardness, per ASTM C836 (ASTM D2240): 30

Elongation at break, percentage, per ASTM D412: 350%

Shear Strength, lbf/in2 (kN/m2) per ASTM D1002: 140

Tensile Strength, lbf/in2 (kN/m2) per ASTM D412: 125

Low temperature flexibility @ -10°F (-23°C), ASTM D816: Pass

Shrinkage: No visible shrinkage after 14 days

Service temperature range, degrees °F (°C): -40 to 200°F (-40 to 93°C)

* + 1. REINFORCING FABRIC:
			1. Stitch-bond polyester used to reinforce COLPHENE LM BARR waterproofing applications where specified.
				1. SOPREMA Inc. POLYFLEECE:

Thickness: 37 mils (0.9 mm)

Weight: 0.18 oz per ft2 (55 g/m2)

Width(s): 4 in (26 cm), 6 in (35 cm), 8 in (53 cm), 39 in (99 cm).

Tensile Strength, lbf/in2 (kN/m2) per ASTM D5035: MD 185, (32.4), CD 10 (17.5)

* + 1. GENERAL PURPOSE SEALANT:
			1. Fast-setting, moisture curing, low VOC, polyether adhesive-sealant.
				1. SOPREMA Inc. SOPRASEAL SEALANT

Packaging: 10.1 oz tubes.

ASTM C920, Type S, Grade NS, Class 25.

Viscosity, cP @ 73°F (23°C), per ASTM D2983: 1,200,000 +/- 400,000 cP

Density, lbs/gal, per ASTM D1475: 11.8 +/- 0.2 lbs/gal

Tack-free time, minutes: 20 +/- 10 min.

Shore A hardness, per ASTM C836 (ASTM D2240): 32-42

Elongation at break, percent, per ASTM D412: 275-325%

Tensile Strength, lbf/in2 (kN/m2) per ASTM D412: 325-375 psi

Low temperature flexibility @ -10°F (-23°C), ASTM D816: Pass

Shrinkage: No visible shrinkage after 14 days

Service temperature range, degrees °F (°C): -40 to 200°F (-40 to 93°C)

VOC (g/L): < 15

* + 1. JOINT SEALANT:
			1. Fast-setting, moisture curing, low VOC, polyether adhesive-sealant system, designed and installed to accommodate building control joints.
				1. CHEM-LINK INC

Packaging: 10.1 oz tubes, 20 oz sausage packs and 3.5 gal pails.

Joint sealant shall meet or exceed requirements of ASTM C920 for Type, Grade and Class required for each specific waterproofing joint.

Refer to manufacturer’s published guidelines and installation instructions.

* + - * 1. CHEM LINK SOF-Rod BACKER ROD

Cylindrical, flexible foam rod for use as sealant backing.

Meets ASTM C717

Meets ASTM C1330, Type B

Meets ASTM D5249, Type 3.

Temperature limits: -45 to 160°F (-43 to 71°C)

* + 1. FLASHING CAP SHEET & PROTECTION COURSE, EXPOSED:
			1. SBS-modified bitumen cap sheet, sanded on the underside, and mineral granules on the exposed top surface. Polyester reinforcement.
				1. SOPREMA Inc. COLPHENE 180 FR GR:

Meets or exceeds ASTM D6164, Type I, Grade G, per ASTM D5147 test methods.

Thickness: 157 mils (4.0 mm)

Width: 39.4 in (1 m)

Length: 32.8 ft (10 m)

Roll weight: 116 lb (52.7 kg)

Net mass per unit area, lb/square (g/sq m): 108 lb (5276 g)

Granule Surfacing: Mineral granules.

* + 1. PROTECTION COURSE, SBS MODIFIED BITUMEN SHEET, CONCEALED:
			1. SBS-modified bitumen self-adhesive ply, sanded on top and release film and self-adhesive on the bottom surfaces. Polyester-glass fiber reinforcement.
				1. SOPREMA Inc. COLPHENE BSW PROTECT’R:

Thickness: 80 mils (2.0 mm)

Width: 39.4 in (1 m)

Length: 49.2 ft (15 m)

Tensile Strength: 63lbf/in.(11kN/m)

Puncture Resistance: 225lbf (1000N)

Tear Resistance: 79lbf. (350N)

* + - 1. SBS-modified bitumen ply sheet, sanded on both top and bottom surfaces. Glass fiber reinforcement.
				1. SOPREMA Inc. COLPHENE SANDED:

Meets or exceeds ASTM D6163, Type I, Grade S, per ASTM D5147 test methods.

Thickness: 87 mils (2.2 mm)

Width: 39.4 in (1 m)

Length: 49.2 ft (15 m)

Roll weight: 102 lb (46.3 kg)

Net mass per unit area, lb/100 sq ft (g/sq m): 63 lb (3074 g).

* + - 1. SBS-modified bitumen ply sheet, sanded on both top and bottom surfaces. Polyester reinforcement.
				1. SOPREMA Inc. COLPHENE 180 SANDED:

Meets or exceeds ASTM D6164, Type I, Grade S, per ASTM D5147 test methods.

Thickness: 87 mils (2.2 mm)

Width: 39.4 in (1 m)

Length: 49.2 ft (15 m)

Roll weight: 83 lb (37.7 kg)

Net mass per unit area, lb/square (g/sq m): 52.3 lb (2552 g).

* + 1. PROTECTION COURSE, ASPHALTIC BOARD:
			1. Mineral fortified, asphaltic roof substrate board with glass fiber facers. For use as roof cover-board and for vertical flashing substrate.
				1. SOPREMA Inc. 1/8 in SOPRABOARD:

Weight: lb/ft2 (kg/m2): 0.9 (4.4)

Thickness in (mm) 1/8 (3.2)

Dimensions [4 x 4] [4 x 5] [4 x 8] ft. ([1.2 x 1.2] [1.2 x 1.5] [1.2 x 2.4] m)

Water absorption: Less than 1 percent per ASTM D994.

Compressive strength, psi (kPa) measured at 50 percent compression, per ASTM C472: 1,610 (11,100)

Puncture resistance, lbf (N) per ASTM E154: 90 (400)

* + - * 1. SOPREMA Inc. ¼ in SOPRABOARD:

Thickness in (mm) 1/4 (6.4)

Dimensions: [4 x 4] [4 x 5] [4 x 8] ft. ([1.2 x 1.2] [1.2 x 1.5] [1.2 x 2.4] m)

Weight: lb/ft2 (kg/m2): 1.9 (9.3)

Water absorption: Less than 1 percent per ASTM D994.

Compressive strength, psi (kPa) measured at 50 percent compression, per ASTM C472: 1,320 (9,100)

Puncture resistance, lbf (N), per ASTM E154: 100 (445)

1. **EXECUTION**
	1. EXAMINATION
		1. GENERAL
			1. Examine all substrates prior to beginning work. Examination includes, but not limited to, visual observations, qualitative analysis, and or quantitative testing measures as necessary to ensure conditions are satisfactory to begin work.
			2. During the application of specified materials, the applicator shall continue to examine all project conditions to ensure conditions remain satisfactory to complete the specified waterproofing and associated work.
		2. SURFACE CONDITIONS
			1. Examine substrates to ensure substrates are flat, free of fins or planar irregularities greater than 6.4 mm in 3 m (1/4 inch in 10 ft). Verify that no excess mortar exists on masonry ties, shelf angle and other obstructions.
			2. Examine concrete substrates to ensure surfaces have a profile of ICRI Concrete Surface Profile (CSP) 2, 3, or 4.
			3. Examine masonry joints to ensure joints are stuck flush and completely filled with mortar.
		3. MOISTURE
			1. Examine concrete and confirm concrete is sufficiently cured as specified, visibly dry and free of surface moisture. Refer to ACI 301 and ACI 308 for examination and evaluation of concrete substrates.
			2. New concrete shall be cured sufficiently for work traffic for a minimum of 3 to 7 days, and as specified.
				1. When necessary to quantify relative humidity (RH) of concrete, testing shall be completed in accordance with ASTM F2170.
			3. Examine vertical substrates and ensure walls are capped to prevent moisture and precipitation from entering the walls during construction.
		4. ADHESION
			1. Qualitative peel tests:
				1. Examine adhesion by conducting qualitative peel tests.
				2. The contractor shall examine adhesion between specified waterproofing materials and prepared substrates using the following qualitative methods:

180 degree peel test. Basis of test is ASTM C794:

Choose 3 or more areas, representative of each substrate.

Clean and prepare the substrate as specified, allow to dry.

Cut 1 inch (2.54 cm) wide x 12 inch (30.48 cm) long strips of specified polyester reinforcing fabric.

Apply specified waterproofing materials to fully encapsulate an 8 to 9 inch (20.32 to 22.86) long section of the 12 inch (30.48) strip of reinforcing fabric, allow a 3 to 4 inch (7.62 to 10.16 cm) “dry tail” to remain un-coated.

Based on conditions, allow sufficient time for samples to fully cure for optimum results.

Grip the “dry tail” end of the reinforcing fabric and pull 180 degrees, parallel with the surface. Use a small fish scale or similar scale to measure quantitative results in pounds of resistance where quantitative results are desired.

For masonry and concrete substrates, results shall demonstrate resistance to peel, with cohesive failure where most of the coating remains adhered to the substrate.

Record results with digital photos for reference.

* + 1. MEMBRANE INTEGRITY TESTING
			1. Prior to installing overburden materials over the waterproofing membrane, examine the membrane integrity by conducting the following nondestructive leak testing:
				1. Water flood testing: Flood horizontal waterproofing substrates using 2 in of water and held for 48 hours. Examine waterproofing for leaks. Refer to ASTM D5957.
				2. Electric Conductivity Testing: Examine all horizontal waterproofing by conducting electric conductivity testing. Testing shall be conducted by qualified technicians.

International Leak Detection (ILD)

Detec Systems, Inc.

Vector Mapping/IR Analyzers

Technical Testing Technologies

Other qualified electric conductivity testing service.

* 1. PREPARATION
		1. GENERAL:
			1. Before commencing work, the contractor shall prepare and clean all work areas to ensure conditions are satisfactory to proceed with the installation of specified waterproofing materials.
			2. Eliminate water discharge and condensation from substrate surfaces, and ensure substrate surfaces are free of surface moisture before and during the application of waterproofing. Allow sufficient time for surfaces to dry before applying the specified waterproofing.
			3. Prepare and protect adjacent areas from damage, overspray and spillage of coating materials.
			4. Equipment:
				1. Ensure appropriate application equipment is prepared and ready for waterproofing installation.
				2. Refer to waterproofing manufacturer’s guidelines for application equipment options.
				3. Refer to equipment manufacture for operating instructions, safety, care and maintenance requirements.

COLPHENE LM BARR (brush, roller or squeegee-grade):

Stiff bristle brushes, ½ to ¾ in nap rollers or ¼ in notched squeegees.

COLPHENE LM BARR (spray-grade)

Pump Model: GRACO @ GH 833

Gun: GRACO Flow Gun with XHD RAC Spray Tip #841, 150 foot hose with ½” ID.

Pump pressure up to 4000psi (276 BAR)

Pump volume rate of 4gal./min. (15.1L/min.)

Tip orifice of 0.041in. (1mm)

Tip Flow Rate of 1.8 GPM (6.83 LPM)

Fan Width @ 24” from surface – 16-18in. (406-457mm)

Pressure @ point of delivery – 2500psi minimum

Hose Length - 150ft max.

Hose ID – ½” max.

* + 1. CONCRETE SUBSTRATE PREPARATION:
			1. Remove concrete form-release agents, curing compound residue, laitance, oxidation, oils, wax, standing water or all other foreign materials that interfere with adhesion.
			2. Prepare concrete in accordance with ASTM D5295.
			3. Clean concrete in accordance with ASTM D4258.
		2. MATERIAL PREPARATION:
			1. COLPHENE LM BARR waterproofing:
				1. Stir COLPHENE LM BARR pails using a paddle mixer and low speed drill prior to use.
				2. COLPHENE LM BARR spray grade supplied in drums and totes may be applied directly from the drum or tote without stirring.
				3. COLPHENE LM BARR shall not be mixed or thinned using solvents, water or other materials.
			2. During cold weather, store waterproofing materials in heated areas at or above 70°F (21°C) before and during application to ensure the material temperature is at or above 70°F (21°C).
			3. Cold weather spray application:
				1. Provide band-type drum and pail heaters designed to pre-heat containers.
				2. Pre-condition drums and maintain waterproofing materials at or above 70 °F (21.1 °C) for optimum application.
	1. FLASHINGS, SEALANTS AND DETAILING
		1. GENERAL:
			1. Refer to manufacturer’s published details and manuals for guidelines.
			2. Flashings, sealants and detailing shall be installed before the waterproofing membrane application, unless otherwise noted.
		2. SURFACE IRREGULARITIES:
			1. Small spalls, voids, bug holes, static cracks (less than 1/8 in deep) and other similar imperfections shall be cleaned and filled flush with the concrete surface using COLPHENE BARR FLASHING, COLPHENE LM BARR waterproofing or SOPRASEAL SEALANT.
		3. HORIZONTAL-TO-VERTICAL TRANSITIONS (static, non-moving joints):
			1. At horizontal-to-vertical transitions, where necessary to flash the waterproofing membrane, apply a bead of COLPHENE BARR FLASHING along the joint to create a 45 degree cant with a ¾ in face.
			2. Apply COLPHENE LM BARR 3 to 4 in onto the horizontal surface and 3 to 4 in up onto the vertical surface.
			3. Immediately apply a 6 in wide strip of POLYFLEECE reinforcement into COLPHENE LM BARR, 3 in up the vertical and 3 in onto the horizontal surface. Immediately apply more COLPHENE LM BARR, and work the COLPHENE LM BARR into the POLYFLEECE to ensure the POLYFLEECE is fully encapsulated along the transition.
			4. Refer to manufacturer’s published details.
		4. CORNERS:
			1. Precut POLYFLEECE 6 in wide to extend 3 in on either side of inside and outside corners.
			2. Apply COLPHENE BARR FLASHING at corner area and immediately embed POLYFLEECE reinforcement.
			3. Use tool to work POLYFLEECE into base coat so the POLYFLEECE is fully encapsulated.
			4. Apply more COLPHENE BARR FLASHING over the POLYFLEECE, ensure there are no skips, voids or exposed reinforcement.
		5. SEALANT JOINTS
			1. Refer to ASTM C1193 for design and installation of sealant joints.
				1. Install specified closed cell backer rod into gap and apply appropriate joint sealant to accommodate building joint conditions.
		6. SEALED PENETRATIONS
			1. Sealed penetrations are sealed watertight using unreinforced COLPHENE BARR FLASHING.
				1. Fixtures consist of structural elements, drains, utilities, services, equipment and other materials penetrating the waterproofing substrate. Refer to manufacturer’s published details and guidelines.
				2. Ensure all fixtures are cleaned, prepared and secured to prevent movement.
				3. At penetrations where gaps are less than 1/8 in, apply COLPHENE BARR FLASHING to seal the gap. Tool sealant.
				4. At penetrations where gaps are 1/8 to 1/4 in, refer to ASTM C1193 for design and installation of sealant joints.

For gaps 1/8 to ¼ in, install specified backer rod into gap and apply COLPHENE BARR FLASHING.

Tool sealant to seal all gaps watertight between the substrate and fixture.

* + - * 1. Where gaps are greater than ¼ in, install metal flange or high compressive strength grout around fixture to provide a satisfactory waterproofing. Refer to FLASHED PENETRATIONS.
		1. FLASHED PENETRATIONS
			1. Flashed penetrations are flashed watertight using specified sealants and fully-reinforced COLPHENE LM BARR.
				1. Fixtures consist of structural elements, drains, utilities, services, equipment and other materials penetrating the waterproofing substrate. Refer to manufacturer’s published details and guidelines.
				2. Ensure the fixture is properly cleaned, prepared and secured to prevent movement.
				3. Pre-seal all gaps and joints using COLPHENE BARR FLASHING. Tool sealant to seal the gap between the substrate and fixture.
				4. Precut POLYFLEECE to conform to conditions. Ensure POLYFLEECE is cut to fully reinforce COLPHENE LM BARR
				5. Apply COLPHENE LM BARR to substrate and immediately embed POLYFLEECE reinforcement.
				6. Use brush or trowel to work POLYFLEECE into base coat so the POLYFLEECE is fully encapsulated.
				7. Apply more COLPHENE LM BARR over the POLYFLEECE, ensure there are no skips, voids or exposed reinforcement.
		2. TIE-INS
			1. COLPHENE LM BARR:
				1. Where COLPHENE LM BARR materials have cured, apply new COLPHENE LM BARR overlapped onto the cured COLPHENE LM BARR a minimum of 6 in.
				2. Where COLPHENE LM BARR has been exposed for an extended period (72 hours or more), become dirty, clean the surface using a clean cloth and xylene solvent.
				3. Apply new COLPHENE LM BARR overlapped 6 in onto the clean, dry waterproofing surface.
	1. HORIZONTAL AND VERTICAL WATERPROOFING, REINFORCED
		1. GENERAL:
			1. Install COLPHENE LM BARR fully-reinforced over cleaned and prepared horizontal waterproofing substrates.
			2. When sealants, flashings and related materials are applied prior to COLPHENE LM BARR, allow 24 hours or more for materials to cure before applying waterproofing.
			3. Ensure materials are properly prepared, cleaned, dry and cured before applying COLPHENE LM BARR at tie-ins over sealants, flashings and related materials.
			4. COLPHENE LM BARR shall not be exposed more than 72 hours when applying additional coats. If exposed greater than 72 hours, refer to tie-in instructions for cleaning and preparation, and conduct adhesion tests as necessary.
			5. Refer to manufacturer’s published details and manuals for guidelines.
		2. WATERPROOFING, REINFORCED:
			1. Apply uniform applications of COLPHENE LM BARR brush, roller or squeegee-grade waterproofing using specified application tools and equipment.
			2. Apply uniform applications of COLPHENE LM BARR spray-grade waterproofing using specified spray equipment.
			3. Apply a base layer of 60/90 mils (3.7 gal/square/5.5 gal/square) of COLPHENE LM BARR to the substrate.
			4. Embed POLYFLEECE into base layer of COLPHENE LM BARR.
			5. Apply a top coat of 60/90 mils (3.7 gal/square/5.5 gal/square) of COLPHENE LM BARR.
			6. Apply a total of 120/180 mils (7.4 gal/square/11.0 gal/square) of COLPHENE LM BARR plus the fully encapsulated POLYFLEECE reinforcement.
			7. Use a brush, roller or squeegee to work the COLPHENE LM BARR into the POLYFLECE reinforcement as needed to eliminate “dry” reinforcement, voids, air pockets and wrinkles.
			8. Where substrate conditions are uneven, apply additional COLPHENE LM BARR as needed to ensure the reinforcement is fully encapsulated and covered by COLPHENE LM BARR.
	2. EXPOSED VERTICAL WALL, CURB AND PARAPET FLASHINGS AND EXPOSED HORIZONTAL PROTECTION COURSE:
		1. GENERAL
			1. Thoroughly inspect waterproofing, and make all necessary repairs, prior to installing flashing course and protection course.
			2. Where vertical wall flashings, curbs, parapet flashings, and horizontal waterproofing surfaces will remain permanently exposed, or will be temporarily exposed for greater than 90 days, install specified materials to withstand anticipated UV exposure.
			3. Apply flashing cap sheet over parapet, wall and curbs within 90 days of the application of COLPHENE LM BARR waterproofing to protect the COLPHENE LM BARR from UV exposure.
			4. Refer to published details for exposed parapet, wall and curb flashings.
		2. SOPREMA Inc. COLPHENE 180 FR GR CAP SHEET:
			1. Unroll the flashing cap sheet and allow to relax.
			2. Once relaxed, cut the cap sheet to the required working lengths to accommodate the flashing height and the required over-lap onto the horizontal surface.
			3. Cut the flashing cap sheet from the end of the roll in order to always install flashings to selvage edge line.
			4. Install the flashing cap sheet starting at the top leading edge on the vertical substrate, down the wall, and onto the horizontal surface 4 in or more from the base of the wall.
			5. Eliminate all cap sheet bridging at the vertical-to-horizontal transition.
			6. Extend the flashing cap sheet onto the horizontal surface as required to protect the COLPHENE LM BARR waterproofing from exposure to UV.
			7. Apply COLPHENE BARR FLASHING to the underside of the flashing cap sheet using a ¼ inch notched trowel. Apply 2.0 – 2.5 gallons per square to the sheet. Application rates vary based on substrate conditions.
			8. During the exposed membrane and flashing installation, ensure all plies are completely adhered into place, with no bridging, voids or openings.
			9. Roll-in or press-in the flashing plies during installation to ensure they are in full contact with the substrate below.
			10. Fasten the top leading edge of the flashing cap sheet 8 in on-centers using appropriate anchors or other specified fasteners and plates. Seal fastener penetrations watertight using specified sealant.
			11. Ensure protection course sheet is installed to protect all waterproofing surfaces during the placement of overburden.
	3. PROTECTION COURSE, CONCEALED:
		1. GENERAL
			1. Refer to drawings to determine location and placement of the specified protection course.
			2. Ensure waterproofing is fully cured for 24 hours or more before applying protection course, drainage mat and/or overburden materials.
			3. Apply protection course and/or overburden within 90 days of application of COLPHENE LM BARR waterproofing.
			4. Thoroughly inspect waterproofing, and make all necessary repairs, prior to installing the protection course.
			5. Ensure protection course, overburden, exposed SBS modified bitumen flashings and metal counterflashings protect COLPHENE LM BARR waterproofing from exposure to UV.
		2. SOPREMA Inc. SOPRABOARD
			1. Ensure all waterproofing and flashing substrates are complete, prepared, clean and ready to receive the protection course.
			2. Cut SOPRABOARD to fit tight at penetrations, terminations and transitions.
			3. Adhere SOPRABOARD to the waterproofing:
				1. Fully adhered: Apply COLPHENE LM BARR adhesive layer over waterproofing at 1-1/2 to 2 gallons per square, or as required, to hold the protection course in place. Use a roller or walk-in the SOPRABOARD.
				2. Partially adhered: Apply COLPHENE LM BARR adhesive in ribbons or spots as necessary to hold the protection course in place. Use a roller or walk-in the SOPRABOARD.
			4. Install SOPRABOARD with joints butted together.
			5. Ensure SOPRABOARD is installed to protect all surfaces during the placement of overburden.
		3. SOPREMA Inc. COLPHENE BSW PROTECT’R
			1. Ensure all waterproofing and flashing substrates are complete, prepared, clean and ready to receive the COLPHENE BSW PROTECT’R protection course sheet.
			2. Thoroughly inspect waterproofing, and make all necessary repairs, prior to installing the protection course.
			3. Unroll the sheet onto the substrate and allow time to relax.
			4. Cut rolls to working lengths and widths to conform to conditions, and lay out to always work to a side lap.
			5. Ensure side-laps and end-laps are maintained for full coverage.
			6. Peel the release film from the underside of the sheet. Press and adhere the leading edge to the substrate.
			7. As the release film is peeled away, use a broom or weighted roller to firmly set the sheet in place.
			8. Ensure full contact is made between the sheet and the substrate for adhesion.
			9. Use a hand-roller to roll-in vertical flashings and confined areas to firmly apply pressure.
			10. Eliminate sheet bridging at transitions.
			11. Ensure COLPHENE BSW PROTECT’R is installed to protect all waterproofing surfaces during the placement of overburden.
		4. SOPREMA Inc. COLPHENE SANDED, COLPHENE 180 SANDED, COLPHENE 180 FR GR:
			1. Ensure all waterproofing and flashing substrates are complete, prepared, clean and ready to receive the protection course sheet.
			2. Thoroughly inspect waterproofing, and make all necessary repairs, prior to installing the protection course.
			3. Unroll membrane onto the substrate and allow time to relax.
			4. Cut rolls to working lengths and widths to conform to conditions, and lay out to always work to a side lap.
			5. Ensure side-laps and end-laps are maintained for full coverage.
			6. Fully adhered protection course:
				1. Apply COLPHENE LM BARR adhesive layer over waterproofing at 1-1/2 to 2 gallons per square, or as required, to adhere protection course in place.
			7. Partially adhered protection course:
				1. Apply ribbons or spot-apply COLPHENE LM BARR over the waterproofing as required to hold the protection course firmly in place during the application of subsequent materials.
			8. Use a broom or weighted roller to firmly set the sheet in place. Ensure full contact is made between the ply and the substrate for adhesion.
			9. Eliminate sheet bridging at transitions that may be damaged during the placement of subsequent materials.
			10. Ensure protection course sheet is installed to protect all waterproofing surfaces during the placement of overburden.
	4. CLEAN UP
		1. Visually inspect the COLPHENE LM BARR waterproofing, protection course and exposed SBS modified bitumen flashings each day for debris, trash and other housekeeping issues. Take corrective actions as required to maintain satisfactory conditions.

END OF SECTION