Revised 7.11.2019

COLPHENE® LM BARR PROTECTED MEMBRANE WATERPROOFING TECHNICAL MANUAL

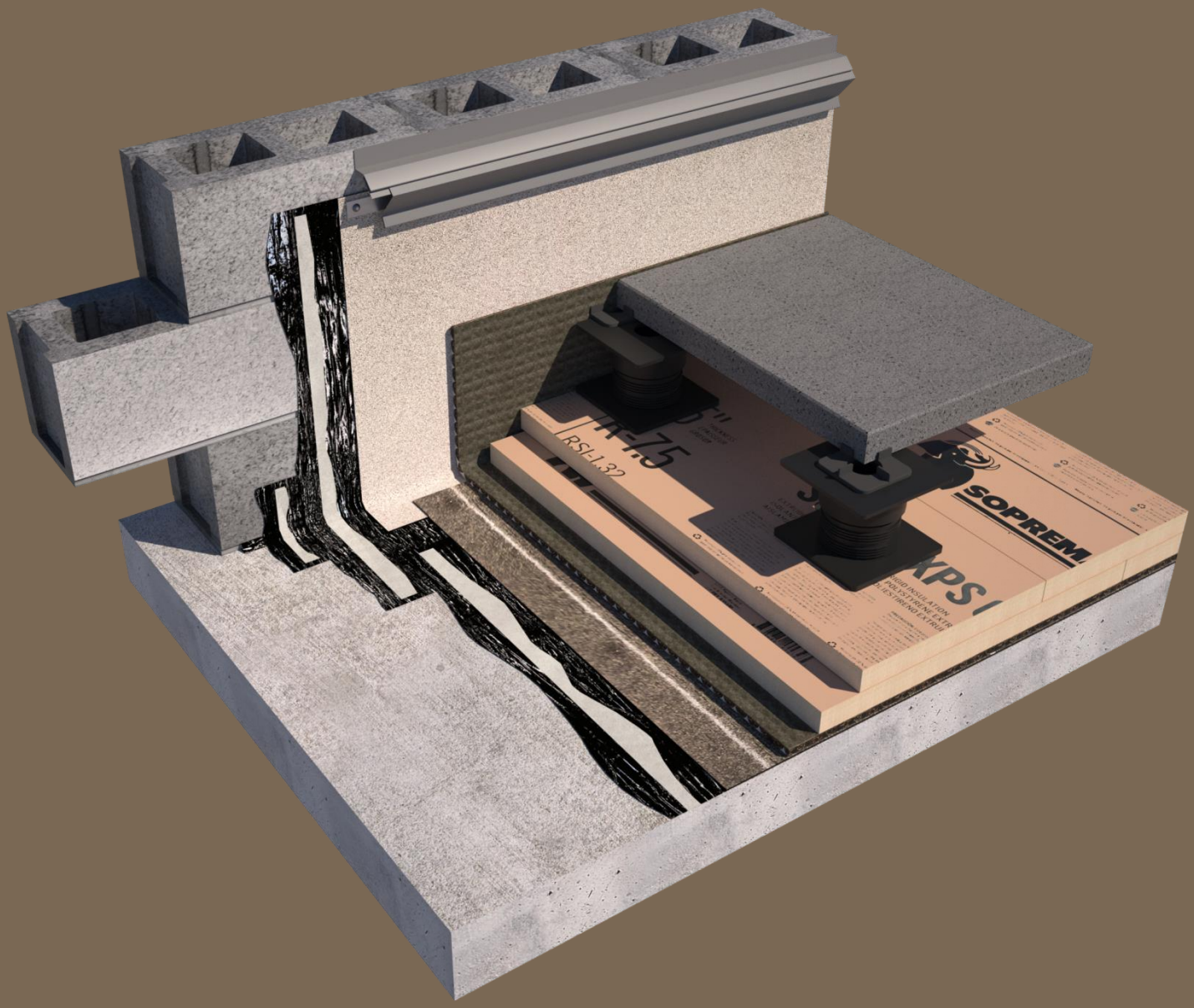

TABLE OF CONTENTS

INTRODUCTION

SOPREMA® COLPHENE® LM BARR is produced for above-grade horizontal and vertical waterproofing applications. Above-grade applications include between-slab waterproofing, plaza decks, protected roof membrane assemblies, vegetative roof systems and planter boxes.

COLPHENE® LM BARR waterproofing products consist of cold-applied, silyl terminated polyether (STPE), single-component moisture-cured, elastomeric materials. COLPHENE® LM BARR is applied using a brush, roller or squeegee. COLPHENE® LM BARR SPRAY is spray-applied, or may also be applied using a brush, roller or squeegee. COLPHENE® LM BARR and COLPHENE® LM BARR SPRAY are reinforced with POLYFLEECE at field (horizontal) and flashing (vertical) applications. COLPHENE® BARR FLASHING is an accessory material that is tooled/trowel-applied at transitions, penetrations and terminations. Protection course sheets and other related accessories are applied over the COLPHENE® LM BARR waterproofing before applying overburden.

COLPHENE® LM BARR is produced using moisture-cured STPE technology, which is ideal for new "green" concrete containing high relative humidity (RH). COLPHENE® LM BARR is applied directly to concrete substrates, primer is not needed. COLPHENE® LM BARR waterproofing membranes are rain-proof within hours, have very low odor, and contain very low VOC's which meet environmental restrictions and sensitive job site requirements.

The "COLPHENE® LM BARR PROTECTED MEMBRANE WATERPROOFING TECHNICAL MANUAL" is intended to offer guidance to SOPREMA® authorized contractors and design professionals. The manual provides specific instructions and details for SOPREMA® waterproofing and related accessories. Refer to applicable building codes, standards and waterproofing industry publications for additional requirements and best-practice guidelines. Refer to current SOPREMA® product data sheets and safety data sheets for specific product data and product-related requirements. For additional information refer to www.soprema.us or contact SOPREMA® at 800.356.3521.

DISCLAIMER

This manual is intended for use by SOPREMA® authorized contractors and design professionals in order to provide instructions and details for the application of SOPREMA® waterproofing when a SOPREMA® warranty will be requested upon project completion. The contents of this manual are consistent with best industry practices, but are not specific to any particular project's needs and are not a substitute for professional design services. SOPREMA® bears no liability nor responsibility for the evaluation or design of any particular project.

The waterproofing material applicator is responsible for ensuring compliance with contract documents, project specifications, industry standards and jurisdictional codes necessary to meet the requirements for specific project applications.

1 SUBSTRATES FOR COLPHENE® LM BARR

1.1 SUBSTRATE EVALUATION, CLEANING, REPAIR AND PREPARATION

General:

- Before beginning the cleaning, repairs and preparation work, ensure project conditions are appropriate to proceed.
- Comply with all project-related health, safety and environmental requirements. Comply with all personal protective equipment (PPE) requirements.
- Review project conditions and determine when and where conditions are appropriate to utilize the specified equipment, materials and methods indicated herein. When conditions are determined to be unsafe or undesirable to proceed, take all necessary measures to prevent or eliminate all unsafe and undesirable exposures and conditions.
- 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.

Substrate Evaluation:

- Examine all substrates before applying COLPLHENE® LM BARR. Ensure substrates are clean, repaired, prepared and otherwise satisfactory before installing waterproofing materials.
- Do not apply COLPHENE® LM BARR materials to wet surfaces, standing water, dew, frost or ice. Surfaces should be dry to the touch with no visible signs of moisture.
- Eliminate water discharge and condensation from substrate surfaces, and ensure substrate surfaces are free of surface moisture before and during the application of waterproofing.
- After precipitation, allow sufficient time for substrate surfaces to dry before applying COLPHENE® LM BARR waterproofing materials.
- New concrete substrates:
    - Concrete substrates should be sufficiently cured as specified by the design professional. Refer to ACI 301, *Specifications for Structural Concrete,* and ACI 308*, Specification for Curing Concrete,* for the examination and evaluation of concrete substrates.
    - Concrete should be cured sufficiently, a minimum of 3 to 7 days, and as necessary to support construction traffic in order to apply COLPHENE® LM BARR. Concrete cure time varies based on project environment. Comply with the project's concrete specifications.
    - When specified or otherwise necessary to measure the relative humidity (RH) of the concrete, complete testing in accordance with ASTM F2170, *Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes*. High relative humidity is acceptable for COLPHENE® LM BARR materials.
    - Examine concrete 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 or concrete debris exists on substrates, masonry ties, shelf angle and other obstructions.
    - Examine concrete substrates to ensure surfaces have a uniform surface profile consistent with Concrete Surface Profile (CSP) 2, 3, or 4 per the International Concrete Repair Institute (ICRI).
    - Rough, pitted, porous concrete surfaces and other surface irregularities may result in pinholes in the COLPLHENE® LM BARR waterproofing. Surface irregularities must be pretreated using COLPHENE® LM BARR, COLPHENE® BARR FLASHING, or SOPRASEAL® SEALANT prior to installing the COLPLHENE® LM BARR waterproofing. Refer to *Substrate repairs* below.
    - Examine the adhesion of COLPLHENE® LM BARR to concrete substrates. Refer to the *Adhesion* section noted below for adhesion test guidelines.
    - Notify the design professional, general contractor and/or other responsible party when concrete conditions are unacceptable to apply COLPLHENE® LM BARR. Ensure corrective action is taken, and conditions are acceptable, before applying COLPLHENE® LM BARR.

- Existing concrete substrates:
    - Refer to guidelines for *New concrete substrates* noted above.
    - Existing concrete substrates should be cleaned, repaired and prepared as necessary to install COLPHENE® LM BARR waterproofing. Refer to the *Cleaning, Preparation and Repairs* sections noted below.
    - Examine the adhesion of COLPLHENE® LM BARR to existing concrete substrates. Refer to the *Adhesion* section noted below for adhesion test guidelines.
    - Notify the design professional, general contractor and/or other responsible party when substrate conditions are found to be unacceptable. Ensure corrective action is taken, and conditions are acceptable before applying COLPLHENE® LM BARR.
- Adhesion:
    - Conduct 180 degree peel tests to examine the adhesion between COLPLHENE® LM BARR and prepared substrates. Refer to ASTM C794, *Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants.*
    - Choose 3 or more test areas that are representative of each substrate.
    - Clean and prepare the substrates as indicated herein.
    - Cut 1 inch (2.54 cm) wide x 12 inch (30.48 cm) long strips of POLYFLEECE reinforcing fabric.
    - Apply COLPLHENE® LM BARR 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-adhered.
    - Based on environmental conditions, allow sufficient time for samples to fully cure (until no longer wet and tacky) 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 concrete substrates, results should demonstrate strong resistance to peel, with cohesive failure. Most of the COLPLHENE® LM BARR should remain bonded to the substrate.
    - Record results with digital photos for reference.
    - Where quantitative measurements are desired, peel resistance of 1 in wide samples should resist 2 to 5 lb/in (0.35 to 0.875 N/mm) or more. Wider fabric samples should measure 2 to 5 pounds per lineal inch of fabric.

Substrate Cleaning:

- Clean new concrete substrates to remove loose dirt, dust and debris as necessary to ensure satisfactory adhesion of the COLPHENE® LM BARR waterproofing materials.
- For existing concrete, refer to the *Substrate Preparation* section below.
- Refer to ASTM D4258, *Standard Practice for Surface Cleaning Concrete for Coatings.*
- Substrates should be sufficiently clean to ensure adequate adhesion of COLPHENE® LM BARR waterproofing.
- Examine adhesion when necessary to confirm substrates are sufficiently clean and ready to apply COLPLHENE® LM BARR. Refer to the *Adhesion* requirements noted above for adhesion test guidelines.

Substrate Preparation:

- New concrete substrates:
    - Refer to the *Evaluation* section for *New concrete substrates*.
    - New, properly designed, installed and finished structural concrete should only require minimal preparation to apply COLPLHENE® LM BARR.
    - Concrete should be prepared in general accordance with ASTM D5295, *Standard Guide for Preparation of Concrete Surfaces for Adhered (Bonded) Membrane Waterproofing Systems.*

    - Concrete should be free of spalls, voids, blow holes and free of loose materials, laitance and efflorescence.
    - Substrates should be sufficiently clean to ensure adequate adhesion of COLPHENE® LM BARR waterproofing. Refer to the *Cleaning* section noted above.
    - Examine adhesion when necessary to confirm substrates are sufficiently prepared and ready to apply COLPLHENE® LM BARR. Refer to the *Adhesion* requirements noted above for adhesion test guidelines.
    - Notify the design professional, general contractor or other responsible party when new concrete has not been properly prepared for the application of COLPLHENE® LM BARR. Ensure corrective action is taken, and conditions are acceptable before applying COLPLHENE® LM BARR.
- Existing concrete substrates:
    - Remove all existing waterproofing materials and all other foreign materials that interfere with the adhesion of COLPHENE® LM BARR.
    - Use mechanical scarifying, grinding or shot blasting methods where necessary to remove residual waterproofing and to provide a suitable concrete surface free of incompatible materials. Refer to the *Evaluation* section noted above.
    - Concrete should be prepared in general accordance with ASTM D5295, *Standard Guide for Preparation of Concrete Surfaces for Adhered (Bonded) Membrane Waterproofing Systems.*
    - Concrete should be free of spalls, voids, blow holes and free of loose materials, laitance and efflorescence.
    - Examine adhesion to confirm substrates are sufficiently prepared and ready to apply COLPLHENE® LM BARR. Refer to the *Adhesion* requirements noted above for adhesion test guidelines.

Substrate Repairs:

- Notify the design professional, general contractor or other responsible party upon discovery of significant damages and concrete deficiencies that cannot be properly addressed by cleaning and preparation measures indicated above.
- Ensure corrective action is taken, and repairs are acceptable, before applying COLPLHENE® LM BARR waterproofing.
- Minor repairs:
    - Minor concrete irregularities that are 1/8 to 1/4 in include small spalls, pitting, voids, holes, static cracks and other minor irregularities.
    - Clean and remove dust and debris from the irregularities.
    - Pretreat concrete irregularities using COLPHENE® LM BARR, COLPHENE® BARR FLASHING, or SOPRASEAL® SEALANT. Use spray equipment, brush, roller or trowel to work-in the material, and bond the waterproofing material to the irregularity.
    - Ensure substrates are pretreated to provide uniform surfaces before applying the reinforced COLPHENE® LM BARR waterproofing.

2 COLPHENE® LM BARR MEMBRANE

2.1 FLASHING MEMBRANE

General:

- COLPHENE® LM BARR (brush, roller or squeegee-grade) or COLPHENE® LM BARR SPRAY (spray grade) may be used to apply waterproofing for the field and for flashings.
- Before applying COLPHENE® LM BARR, ensure conditions are acceptable to proceed. Refer to Section 1.1 *SUBSTRATE EVALUATION, CLEANING, REPAIR AND PREPARATION.*
- The fully reinforced COLPHENE® LM BARR flashings are generally installed first at penetrations, termination and transitions before installing the COLPHENE® LM BARR field membrane. It is also acceptable to install flashings after the field membrane has been completed. Refer to the flashing details noted below.
- Install subsequent coats of COLPHENE® LM BARR within 72 hours of the initial application. For additional coats, and at tie-ins, ensure the surface is clean and free of foreign materials that may interfere with adhesion.
- Weather and environmental conditions:
    - COLPHENE® LM BARR STPE/polyether materials are moisture cured. Materials cure faster and skin over quickly when exposed to high temperatures.
    - COLPHENE LM BARR materials should be stored at or above room temperature (70°F (21°C)) for optimum application.
    - The ambient application temperature should be between 35°F (1.7°C) and 95°F (35°C).
    - The substrate temperature should be between 35°F (1.7°C) and 120°F (48.9°C). Monitor substrate and material temperatures to ensure conditions remain satisfactory while applying COLPHENE® LM BARR.
    - COLPHENE® LM BARR materials are not subject to freezing; however, materials may become viscous and difficult to apply when the material is cold. During periods of cold weather, materials should be stored in a heated area and maintained at or above 70°F (21°C). Provide band-type drum and pail heaters designed to heat containers as necessary when applying COLPHENE® LM BARR during cold weather.
    - During hot weather, COLPHENE® LM BARR may cure and skin-over quickly. During hot, sunny conditions store materials in cool or shaded areas away from direct sunlight.
    - Environmental conditions such as sun, cloud cover, wind, humidity, and shade impact the application and cure time. Monitor the application of COLPHENE® LM BARR and adjust application methods as necessary to accommodate changing weather conditions.
    - Surfaces should be dry to the touch with no visible signs of moisture. Do not apply COLPHENE® LM BARR materials to wet surfaces, standing water, dew, frost or ice.
    - Ensure all materials and substrates remain above the dew point temperature to prevent condensation. The ambient temperature should be well above the dew point temperature, with no dew, fog or condensation present.
    - COLPHENE® LM BARR generally cures within one day, ready for foot traffic in 24 hours. The cure time is 3 hours for each 30 mils applied at 70°F (21°C) and 50 percent relative humidity. Cure time varies based upon project conditions.
    - Examine the COLPHENE® LM BARR waterproofing to ensure it is cured sufficiently (not wet nor tacky) to support construction traffic before walking over the waterproofing and before applying subsequent materials.
    - COLPHENE® LM BARR should be fully protected from UV exposure within 90 days of application.

Flashing Preparation:

- Ensure pipes, drains, equipment, etc. to be flashed are clean, prepared and secured to prevent movement, and all gaps and breaks between substrates are properly sealed before applying the COLPHENE® LM BARR materials.
- Before applying the COLPHENE® LM BARR, pre-cut the POLYFLEECE reinforcing fabric to conform to flashings. Cut reinforcing to ensure the COLPHENE® LM BARR is fully reinforced and overlapped at finger -cuts, side-laps and end-laps to eliminate skips or breaks in the reinforcement.
- Ensure sufficient application tools and equipment are ready and available before beginning work. Refer to the equipment manufacturer's instructions, safety, care and maintenance requirements.
- Spray equipment:
    - Pump Model: GRACO GH 833 hydraulic airless sprayer
    - Gun: GRACO Flow Gun with XHD RAC Spray Tip #841, 150 foot hose with ½" ID.
    - Pump pressure up to 4,000 psi (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 – 2500 psi minimum
    - Hose Length – 150 ft max.
    - Hose ID – ½ in max.
- Manual/hand held application tools and equipment:
    - Stiff bristle brushes.
    - ½ to ¾ in naps, rollers and handles.
    - ¼ in notched squeegees and handles.
    - Trowel, flat-blade putty knife, joint sealant tools.
- Ensure sufficient COLPHENE® LM BARR and POLYFLEECE materials are available and ready for application. Refer to *Weather and environmental conditions* noted above.
- Stir COLPHENE® LM BARR pails using a paddle mixer and low speed drill prior to use.
- COLPHENE® LM BARR SPRAY supplied in drums and totes may be applied directly from the drum or tote without stirring.

Flashing Application:

- COLPHENE® LM BARR (brush, roller or squeegee-grade) or COLPHENE® LM BARR SPRAY (spray grade) may be used to apply COLPHENE® LM BARR waterproofing for flashing details.
- Pretreat concrete irregularities using COLPHENE® LM BARR, COLPHENE® BARR FLASHING or SOPRASEAL® SEALANT. Use a brush, roller or trowel to fill imperfections and provide a smooth, uniform surface before applying the reinforced COLPHENE® LM BARR waterproofing. Refer to Section 1.1 SUBSTRATE EVALUATION, CLEANING, REPAIR AND PREPARATION
- Horizontal-to-vertical transitions at walls and curbs:
    - Refer to Figure 2.1a below.
    - Apply a bead of COLPHENE® BARR FLASHING along the joint, tool-in the material to create a 45 degree cant with a ¾ in face.
    - At the angle transition, apply 60 mils (3.7 gal/square) of COLPHENE® LM BARR waterproofing 3 to 4 in onto the horizontal and vertical surfaces. Immediately set POLYFLEECE reinforcement into the wet COLPHENE® LM BARR. Work the fleece into the COLPHENE® LM BARR waterproofing to prevent wrinkles. Ensure the POLYFLEECE reinforcing fabric is cut to conform to conditions so that the COLPHENE® LM BARR is fully reinforced and overlapped at cuts, side-laps and end-laps. Overlap POLYFLEECE side-laps a minimum of 2 in. Apply COLPHENE® LM BARR between POLYFLEECE laps.
    - Apply an additional 60 mils (3.7 gal/square) of COLPHENE® LM BARR.

- Use a brush, roller or squeegee to work the COLPHENE® LM BARR into the POLYFLEECE reinforcement as needed to eliminate "dry" reinforcement, voids, air pockets and wrinkles.
- For the horizontal and vertical substrates, apply a minimum 60 mils (3.7 gal/square) base layer of COLPHENE® LM BARR waterproofing. Immediately set POLYFLEECE reinforcement into the wet COLPHENE® LM BARR. Work the fleece into the COLPHENE® LM BARR waterproofing to prevent wrinkles. Ensure the POLYFLEECE reinforcing fabric is cut to conform to conditions so that the COLPHENE® LM BARR is fully reinforced and overlapped at cuts, side-laps and end-laps. Overlap POLYFLEECE side-laps a minimum of 2 in. Apply COLPHENE® LM BARR between POLYFLEECE laps.
- Apply a minimum 60 mils (3.7 gal/square) top coat of COLPHENE® LM BARR.
- Use a brush, roller or squeegee to work the COLPHENE® LM BARR into the POLYFLEECE reinforcement as needed to eliminate "dry" reinforcement, voids, air pockets and wrinkles.
- Ensure the COLPHENE® LM BARR waterproofing is fully reinforced.
- COLPHENE® LM BARR vertical flashings should extend 8 in above the horizontal surface of the exposed overburden.
- These fundamentals apply to other similar waterproofing transition details.

- Waterproofing penetrations and drains:
  - Refer to Figures 2.1b and 2.1c below.
  - Apply 60 mils (3.7 gal/square) COLPHENE® LM BARR waterproofing 3 to 4 in onto the horizontal and vertical surfaces.
  - Immediately set POLYFLEECE reinforcement into the wet COLPHENE® LM BARR waterproofing. Work the fleece into the COLPHENE® LM BARR waterproofing to prevent wrinkles. Ensure the POLYFLEECE reinforcing fabric is cut to conform to conditions so that the COLPHENE® LM BARR waterproofing is fully reinforced and overlapped at cuts, side-laps and end-laps.
  - Immediately apply 60 mils (3.7 gal/square) of COLPHENE® LM BARR waterproofing, and work the COLPHENE® LM BARR into the POLYFLEECE to ensure the POLYFLEECE is fully encapsulated.
  - Ensure the COLPHENE® LM BARR waterproofing is fully reinforced.
  - These fundamentals apply to other similar waterproofing penetration details.
- COLPHENE® LM BARR tie-ins between field and flashings:
  - At flashing tie-ins where COLPHENE® LM BARR materials have cured, apply new COLPHENE® LM BARR overlapped onto the cured COLPHENE® LM BARR a minimum of 4 in.
- COLPHENE® LM BARR daily tie-ins:
  - Where COLPHENE® LM BARR has been exposed for an extended period (72 hours or more), or has become dirty, clean the COLPHENE® LM BARR surface using a clean cloth and xylene solvent. Apply new COLPHENE® LM BARR overlapped 6 in onto the clean, dry waterproofing surface.
- Flashing protection course:
  - COLPHENE® LM BARR waterproofing requires a protection course to eliminate exposure from UV. Protection is also required to protect the waterproofing from potential damages resulting from overburden materials, construction traffic and environmental exposures.
  - Ensure waterproofing is cured sufficiently (not wet or tacky) for 24 hours or more before applying the protection course over the COLPHENE® LM BARR waterproofing. Waterproofing should not be left exposed for more than 90 days after applying the COLPHENE® LM BARR.
  - Ensure the COLPHENE® LM BARR has been thoroughly inspected and all deficiencies corrected before applying the protection course. Refer to the *Flashing inspection* section below.
  - SBS modified bitumen flashing cap sheet protection course:
    - Where COLPHENE® LM BARR flashing details are exposed to UV, install COLPHENE® 180 FR GR, or other approved SOPREMA SBS modified bitumen flashing cap sheet to protect the waterproofing from UV exposure. Refer to Figure 2.1a below.
    - Unroll the flashing cap sheet and allow it to relax.
    - Once relaxed, cut the COLPHENE® 180 FR GR cap sheet to the required working lengths to accommodate the flashing height and the required over-lap onto the horizontal surface.

- Cut COLPHENE® 180 FR GR from the end of the roll in order to always install flashings to the selvage edge line.
- Install COLPHENE® 180 FR GR 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/curb.
- Eliminate all bridging and voids at the vertical-to-horizontal transition.
- Extend COLPHENE® 180 FR GR onto the horizontal surface as required to protect the COLPHENE® LM BARR waterproofing from exposure to UV.
- Apply COLPHENE® BARR FLASHING or COLPLY™ EF FLASHING CEMENT to the underside of COLPHENE® 180 FR GR using a ¼ inch notched trowel. Apply 2.0 – 2.5 gallons per square to the sheet. Application rates vary based on substrate conditions.
- Ensure the flashing cap sheet is completely adhered in place, with no bridging, voids or openings.
- Roll-in or press-in the flashing cap sheet during installation to ensure they are in full contact with the substrate below.
- Fasten the top leading edge of the flashing cap sheet 8 in on-centers using appropriate anchors or fasteners and plates. Seal fastener penetrations watertight using SOPRASEAL® SEALANT.
- Ensure protection course is in place before the installation of overburden materials.

Flashing Inspection:

- Each day, physically inspect all COLPHENE® LM BARR flashings before concealing the waterproofing with the protection course and overburden.
- Closely examine the COLPHENE® LM BARR to ensure there are no pin holes.
  - Each day, repair all areas where pin holes exist by applying an additional 60 mils (3.7 gal/square) of COLPHENE® LM BARR waterproofing to seal all pinholes.
- Inspect the COLPHENE® LM BARR for voids, wrinkles, open laps, blisters or other deficiencies that involve the POLYFLEECE reinforcement.
  - Cut out and replace all damaged and deficient areas of waterproofing with COLPHENE® LM BARR and POLYFLEECE reinforcement.
- Inspect the protection course, and ensure the protection course conceals and protects all COLPHENE® LM BARR waterproofing surfaces before the placement of overburden.

Table 2.1a COLPHENE® LM BARR Flashing Protection Course

Protection Course	Installation
COLPHENE® 180 FR GR	Fully adhered with COLPHENE® BARR FLASHING or COLPLY™ EF FLASHING CEMENT

Table 2.1b COLPHENE® LM BARR Warranty Term & Flashing Membrane Thickness

Warranty Term	Minimum Thickness	Approximate Coverage Rate
20 years	60 mil base layer/POLYFLEECE/60 mil top coat totaling 120 mils	2 layers @ 3.7 gals/100 ft^2 totaling 7.4 gals/100 ft^2
30 years	90 mil base layer/POLYFLEECE/90 mil top coat totaling 180 mils	2 layers @ 5.5 gals/100 ft^2 totaling 11.0 gals/100 ft^2

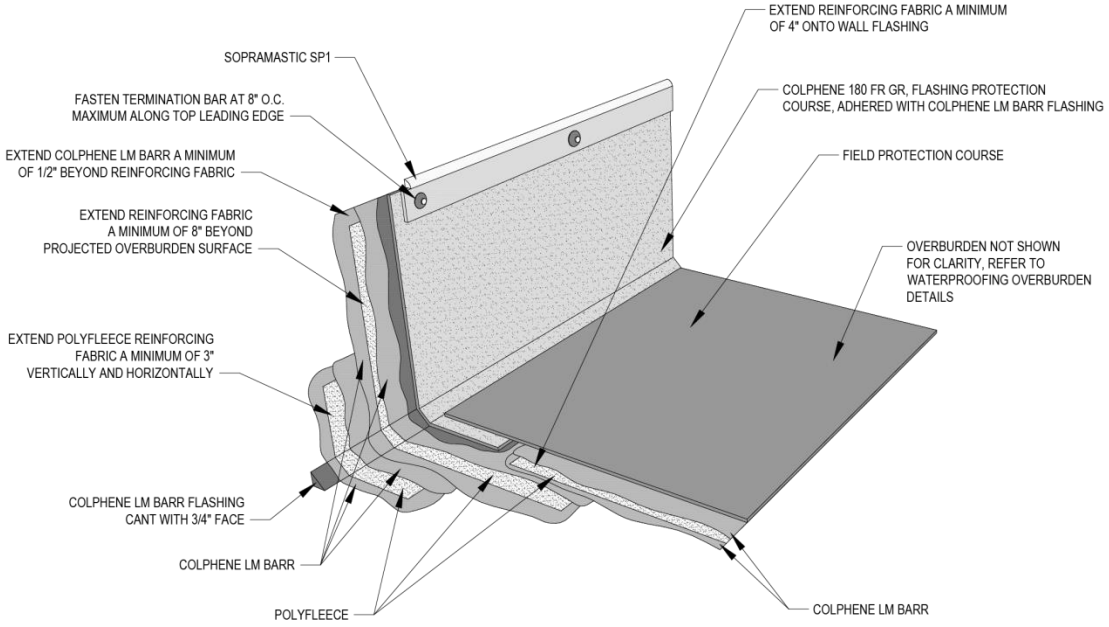

Figure 2.1a COLPHENE® LM BARR At Wall/Curb

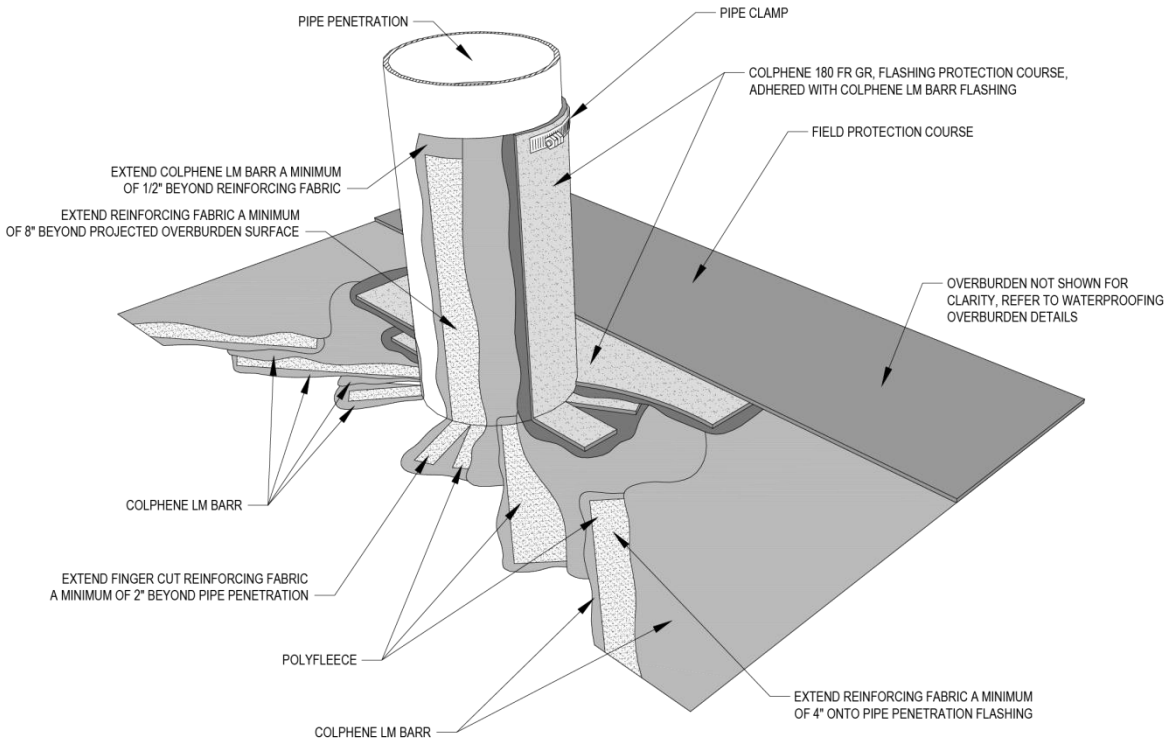

Figure 2.1b COLPHENE® LM BARR At Penetration

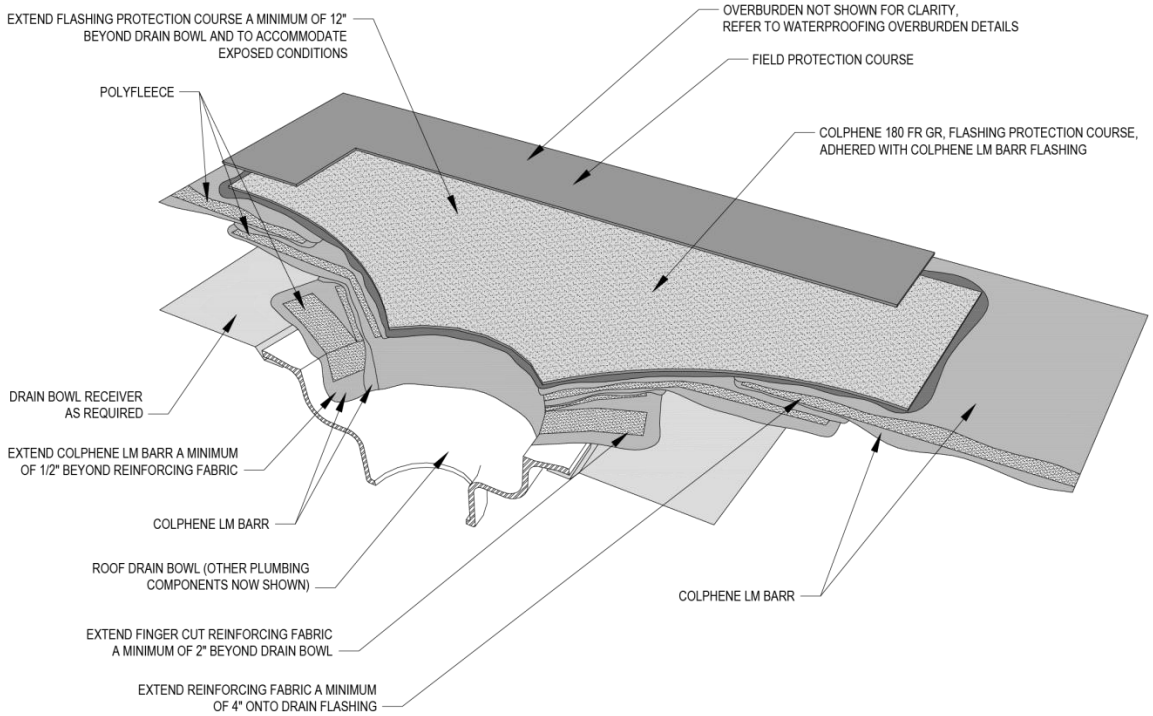

Figure 2.1c COLPHENE® LM BARR At Roof Drain

2.2 FIELD MEMBRANE

General:

- COLPHENE® LM BARR (brush, roller or squeegee-grade) or COLPHENE® LM BARR SPRAY (spray grade) may be used to apply COLPHENE® LM BARR waterproofing for the field (horizontal) and flashings (vertical).
- Before applying COLPENE® LM BARR, ensure conditions are acceptable to proceed. Refer to Section 1.1 *SUBSTRATE EVALUATION, CLEANING, REPAIR AND PREPARATION.*
- The fully reinforced COLPHENE® LM BARR flashings are generally installed first at penetrations, termination and transitions before installing the COLPHENE® LM BARR field membrane. It is also acceptable to install flashings after the field membrane has been completed. Refer to the flashing details noted in Section 2.1 Flashing Membrane.
- Install subsequent coats of COLPHENE® LM BARR within 72 hours of the initial application. For additional coats, and at tie-ins, ensure the surface is clean and free of foreign materials that may interfere with adhesion.
- Weather and environmental conditions:
    - COLPHENE® LM BARR STPE/polyether materials are moisture cured. Materials cure faster and skin over quickly when exposed to high temperatures.
    - COLPHENE® LM BARR materials should be stored at or above room temperature (70°F (21°C)) for optimum application.
    - The ambient application temperature should be between 35°F (1.7°C) and 95°F (35°C).
    - The substrate temperature should be between 35°F (1.7°C) and 120°F (48.9°C). Monitor substrate and material temperatures to ensure conditions remain satisfactory while applying COLPHENE® LM BARR.
    - COLPHENE® LM BARR materials are not subject to freezing; however, materials may become viscous and difficult to apply when the material is cold. During periods of cold weather, materials should be stored in a heated area and maintained at or above 70°F (21°C). Provide band-type drum and pail heaters designed to heat containers as necessary when applying COLPHENE® LM BARR during cold weather.
    - During hot weather, COLPHENE® LM BARR may cure and skin-over quickly. During hot, sunny conditions store materials in cool or shaded areas away from direct sunlight.
    - Environmental conditions such as sun, cloud cover, wind, humidity, and shade impact the application and cure time. Monitor the application of COLPHENE® LM BARR and adjust application methods as necessary to accommodate changing weather conditions.
    - Surfaces should be dry to the touch with no visible signs of moisture. Do not apply COLPHENE® LM BARR materials to wet surfaces, standing water, dew, frost or ice.
    - Ensure all materials and substrates remain above the dew point temperature to prevent condensation. The ambient temperature should be well above the dew point temperature, with no dew, fog or condensation present.
    - COLPHENE® LM BARR generally cures within one day, ready for foot traffic in 24 hours. The cure time is 3 hours for each 30 mils applied at 70°F (21°C) and 50 percent relative humidity. Cure time varies based upon project conditions.
    - Examine the COLPHENE® LM BARR waterproofing to ensure it is cured sufficiently (not wet nor tacky) to support construction traffic before walking over the waterproofing and before applying subsequent materials.
    - COLPHENE® LM BARR should be fully protected from UV exposure within 90 days of application.

Field Membrane Preparation:

- Ensure sufficient application tools and equipment are ready and available before beginning work. Refer to the equipment manufacturer's instructions, safety, care and maintenance requirements.
- Spray equipment for applying COLPHENE® LM BARR SPRAY (spray grade):

    - Pump Model: GRACO GH 833 hydraulic airless sprayer
    - Gun: GRACO Flow Gun with XHD RAC Spray Tip #841, 150 foot hose with ½" ID.
    - Pump pressure up to 4,000 psi (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 – 2500 psi minimum
    - Hose Length – 150 ft max.
    - Hose ID – ½" max.
- Manual/hand held application tools and equipment for applying both COLPHENE® LM BARR (brush, roller or squeegee-grade) or COLPHENE® LM BARR SPRAY (spray grade):
    - Stiff bristle brushes
    - ½ to ¾ in naps, rollers and handles.
    - ¼ in notched squeegees and handles.
    - Trowel, flat-blade putty knife, joint sealant tools.
- Ensure sufficient COLPHENE® LM BARR and POLYFLEECE materials are available and ready for application. Refer to *Weather and environmental conditions* noted above.
- Stir COLPHENE® LM BARR pails using a paddle mixer and low speed drill prior to use.
- COLPHENE® LM BARR SPRAY supplied in drums and totes may be applied directly from the drum or tote without stirring.

Field Membrane Application:

- Pretreat concrete irregularities using COLPHENE® LM BARR, COLPHENE® BARR FLASHING or SOPRASEAL® SEALANT. Use a brush, roller or trowel to fill imperfections and provide a smooth, uniform surface before applying the reinforced COLPHENE® LM BARR waterproofing. Refer to Section 1.1 SUBSTRATE EVALUATION, CLEANING, REPAIR AND PREPARATION
- Field Membrane:
    - COLPHENE® LM BARR (brush, roller or squeegee-grade) or COLPHENE® LM BARR SPRAY (spray grade) may be used to apply COLPHENE® LM BARR waterproofing for the field.
    - Apply uniform applications of COLPHENE® LM BARR waterproofing using the appropriate application tools and equipment.
    - Apply a minimum 60 mils (3.7 gal/square) base layer of COLPHENE® LM BARR to the substrate.
    - Immediately set POLYFLEECE reinforcement into the wet COLPHENE® LM BARR. Overlap POLYFLEECE side-laps a minimum of 2 in. and end-laps a minimum of 4 in. Apply COLPHENE® LM BARR between POLYFLEECE laps.
    - Work the fleece into the COLPHENE® LM BARR to prevent wrinkles. Ensure the POLYFLEECE reinforcing fabric is cut to conform to conditions so that the COLPHENE® LM BARR is fully reinforced and overlapped at cuts, side-laps and end-laps.
    - Apply a minimum 60 mils (3.7 gal/square) top coat of COLPHENE® LM BARR.
    - Use a brush, roller or squeegee to work the COLPHENE® LM BARR into the POLYFLEECE reinforcement as needed to eliminate "dry" reinforcement, voids, air pockets and wrinkles.
    - 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 .
- COLPHENE® LM BARR tie-ins between field and flashings:
    - At flashing tie-ins where COLPHENE® LM BARR materials have cured, apply new COLPHENE® LM BARR overlapped onto the cured COLPHENE® LM BARR a minimum of 4 in.
- COLPHENE® LM BARR daily tie-ins:
    - Where COLPHENE® LM BARR has been exposed for an extended period (72 hours or more), or has become dirty, clean the COLPHENE® LM BARR surface using a clean cloth and xylene solvent. Apply new COLPHENE® LM BARR overlapped 6 in onto the clean, dry waterproofing surface.

- Protection course:
  - COLPHENE® LM BARR waterproofing requires a protection course to eliminate exposure from UV. Protection is also required to protect the waterproofing from potential damages resulting from overburden materials, construction traffic and environmental exposures.
  - Many protection course options are available. Refer to Table 2.2a below.
  - Ensure the COLPHENE® LM BARR waterproofing is cured sufficiently (not wet or tacky) for 24 hours or more before applying the protection course. The COLPHENE® LM BARR should not be left exposed for more than 90 days.
  - Ensure the COLPHENE® LM BARR has been thoroughly inspected and all deficiencies corrected before applying the protection course. Refer to the *Field membrane inspection* section below.
  - SBS modified bitumen field protection course:
    - Refer to Table 2.2a for SOPREMA SBS modified bitumen ply sheet options for the field protection course.
    - Unroll the sheet onto the substrate and allow time to relax.
    - Cut the sheet to working lengths and widths to conform to conditions, and lay out the sheets to work to the side-lap.
    - Ensure side-laps and end-laps are maintained, and ensure the sheet is installed to cover and protect all COLPHENE® LM BARR surfaces.
    - The sheet may be loose laid, partially adhered or fully adhered to the COLPHENE® LM BARR waterproofing surface. Refer to options in Table 2.2a.
    - Overlap the sheet onto the flashing protection course to ensure the COLPHENE® LM BARR waterproofing is not exposed to UV nor in direct contact with the overburden. Refer to Figures 2.1a through 2.1c.
    - When adhering the sheet in place, use a broom or weighted roller to firmly set the sheet and bond it in place.
  - SOPRABOARD™ field protection course:
    - Refer to Table 2.2a for SOPRABOARD™ options for the field protection course.
    - Cut the SOPRABOARD™ so that joints are tightly butted together.
    - Ensure the SOPRABOARD™ is installed to ensure the boards cover and protect all COLPHENE® LM BARR surfaces.
    - SOPRABOARD™ may be loose laid, partially adhered or fully adhered to the COLPHENE® LM BARR waterproofing. Refer to Table 2.2a.
    - Overlap SOPRABOARD™ onto the flashing protection course to ensure the COLPHENE® LM BARR waterproofing is not exposed. Refer to Figures 2.1a through 2.1c.
    - When adhering SOPRABOARD™, use a roller or walk-in the boards.
  - COLPHENE® BSW PROTECT'R field protection course:
    - Refer to Table 2.2a for the field protection course options.
    - Unroll the sheet onto the substrate and allow time to relax.
    - Cut the sheet to working lengths and widths to conform to conditions, and lay out to always work to a side-lap.
    - Ensure side-laps and end-laps are maintained for full coverage.
    - Peel the release film from the underside of the sheet. Press and adhere the leading edge to the substrate.
    - As the release film is peeled away, use a broom or weighted roller to firmly set the sheet in place.

Field membrane inspection:

- Before allowing foot traffic and construction activities over the COLPHENE® LM BARR, closely examine the application to ensure the waterproofing has cured sufficiently to allow foot traffic. Generally, 24 hours is sufficient time to allow foot traffic; however, the cure time may be longer during cold weather.

- Each day, physically inspect all COLPHENE® LM BARR flashings before concealing the waterproofing with the protection course and overburden.
- Closely examine the COLPHENE® LM BARR to ensure there are no pin holes.
    - Each day, repair all areas where pin holes exist by applying an additional 60 mils (3.7 gal/square) of COLPHENE® LM BARR waterproofing to seal all pinholes.
- Inspect the COLPHENE® LM BARR for voids, wrinkles, open laps, blisters or other deficiencies that involve the POLYFLEECE reinforcement.
    - Cut out and replace all damaged and deficient areas of waterproofing with COLPHENE® LM BARR and POLYFLEECE reinforcement.
- Inspect the protection course, and ensure the protection course conceals and protects all COLPHENE® LM BARR waterproofing surfaces before the placement of overburden.

Table 2.2a COLPHENE® LM BARR Field Protection Course	
Protection Course	**Installation**
COLPHENE® 180 SANDED, COLPHENE® SANDED, COLPHENE® 180 FR GR	Loose Laid
	Partially adhered using ribbons or spots of COLPHENE® LM BARR or COLPHENE® LM BARR SPRAY
	*Fully adhered with COLPHENE® LM BARR or COLPHENE® LM BARR SPRAY at 1.5 to 2 gallons per square
SOPRABOARD™ 1/8”, SOPRABOARD™ 1/4”	Loose Laid
	Partially adhered with ribbons or spots of COLPHENE® LM BARR or COLPHENE® LM BARR SPRAY
	Fully adhered with COLPHENE® LM BARR or COLPHENE® LM BARR SPRAY at 1.5 to 2 gallons per square
COLPHENE® BSW PROTECT’R	Self-adhered

*Fully adhered protection course may be required for wind uplift approvals. Contact the SOPERMA Technical Support Department for additional information.

Table 2.2b COLPHENE® LM BARR Warranty Term & Field Membrane Thickness		
Warranty Term	**Minimum Thickness**	**Approximate Coverage Rate**
20 years	60 mil base layer/reinforcement/60 mil top coat Totaling 120 mils	2 layers @ 3.7 gals/100 ft^2 totaling 7.4 gals/100 ft^2
*30 years	90 mil base layer/reinforcement/90 mil top coat Totaling 180 mils	2 layers @ 5.5 gals/100 ft^2 totaling 11.0 gals/100 ft^2

*Contact the SOPREMA Warranty Department or Technical Support Department for additional information and warranty terms and conditions.

3 MISCELLANEOUS

3.1 COLPHENE® LM BARR MATERIALS AND ACCESSORIES

General:

- Refer to Table 3.1a for COLPHENE® LM BARR materials and accessories.
- Refer to the Product Data Sheets and Safety Data Sheets for additional product information.

Table 3.1a COLPHENE® LM BARR Materials and Accessories

Product*	Product description**
COLPHENE® LM BARR	Brush, roller, squeegee-grade. Cold-applied, 98% solids, silyl terminated polyether (STPE), single-component moisture-cured, elastomeric waterproofing. Rain-proof within hours, low odor, and very low VOC. May be used for the field and flashing waterproofing for both horizontal and vertical substrates. May be used to adhere horizontal field protection course. Applied using brushes, rollers or squeegees. Packaged in 5 gallon (19 L) pails.
COLPHENE® LM BARR SPRAY	Spray-grade. Cold-applied, 95% solids, silyl terminated polyether (STPE), single-component moisture-cured, elastomeric waterproofing. Rain-proof within hours, low odor, and low VOC. May be used for the field and flashing waterproofing for both horizontal and vertical substrates. May be used to adhere horizontal field protection course. Applied using hydraulic airless spray equipment, and may also be applied using brushes, rollers or squeegees. Packaged in 5 gallon (19 L) pails and 50 gallon (189 L) drums.
POLYFLEECE	Non-woven polyester fleece reinforcement used to reinforce COLPHENE LM BARR waterproofing in the horizontal field and all flashings. Rolls are 50 ft (15.2 m) long. Roll widths are 39 in (99 cm), 8 in (20 cm), 6 in (15 cm) and 4 in (10 cm).
COLPHENE® BARR FLASHING	Trowel-grade. Cold-applied, 100% solids, silyl terminated polyether (STPE), single-component moisture-cured, elastomeric waterproofing. Rain-proof within hours, low odor, and low VOC. A waterproofing accessory material that is tooled or trowel-applied at transitions, penetrations and terminations. May be used to adhere exposed flashing protection course for horizontal and vertical flashings. Packaged in 3.5 gallon (13 L) pails.
SOPRASEAL® SEALANT	Gun-grade. Fast-setting, moisture cured, low VOC, polyether adhesive-sealant. A waterproofing accessory that is tooled or trowel-applied to address irregular concrete surfaces, seal small voids and cracks in waterproofing substrates. Packaged in 10.1 oz tubes.
COLPLY™ EF FLASHING CEMENT	Trowel-grade. Silyl terminated polyether (STPE) flashing cement. An alternative to COLPHENE® BARR FLASHING for applying exposed flashing protection course for field and vertical flashings. Applied using a notched trowel. Packaged in 3.5 gallon (13 L) pails.
COLPHENE® SANDED	SBS modified bitumen, smooth-surfaced, glass fiber reinforced protection course ply sheet with sanded top and bottom surfaces. May be loose-laid, partially adhered or fully adhered to the cured COLPHENE® LM BARR waterproofing. Not for exposed applications. To be covered by overburden. Packaged in 49.2 ft (15 m) long x 39.4 (1 m) wide rolls.
COLPHENE® 180 SANDED	SBS modified bitumen, smooth-surfaced, polyester reinforced protection course ply sheet with sanded top and bottom surfaces. May be loose-laid, partially adhered or fully adhered to the cured COLPHENE® LM BARR waterproofing. Not for exposed applications. To be covered by overburden. Packaged in 49.2 ft (15 m) long x 39.4 (1 m) wide rolls.

Product*	Product description**
COLPHENE® 180 FR GR	SBS modified bitumen, granule-surfaced, polyester reinforced protection course ply sheet with sanded bottom surface. Fully adhered to cured COLPHENE® LM BARR waterproofing when used in exposed flashing applications. May be loose laid, partially adhered or fully adhered when covered by overburden. Packaged in 32.8 ft (10 m) long x 39.4 (1 m) wide rolls.
COLPHENE® BSW PROTECT'R	SBS modified bitumen, smooth-surfaced, self-adhesive, composite polyester-glass reinforced protection course ply sheet with sanded top surface. Self-adhered to the cured COLPHENE® LM BARR waterproofing. Not for exposed applications. To be covered by overburden. Packaged in 49.2 ft (15 m) long x 39.4 (1 m) wide rolls.
SOPRABOARD™	Protection board consisting of a mineral-fortified asphalt core between two fiberglass reinforcing plies. May be loose-laid, partially adhered or fully adhered to the cured COLPHENE® LM BARR waterproofing. Boards dimensions are 4x8 ft 1.2x2.4 m) , 4x5 ft (1.2x1.5 m) and 4x4 ft (1.2x1.2 m). The board thickness is 1/8 in (3.2 mm) and 1/4 in (6.4 mm).

*Refer to www.SOPREMA.us for product data sheets (PDS) or safety data sheets (SDS).
**Refer to additional preparation and application guidelines, and detail drawings included herein. Contact SOPREMA® at 800.356.3521 for more information.