



COLPHENE® LM BARR BELOW GRADE WATERPROOFING TECHNICAL MANUAL

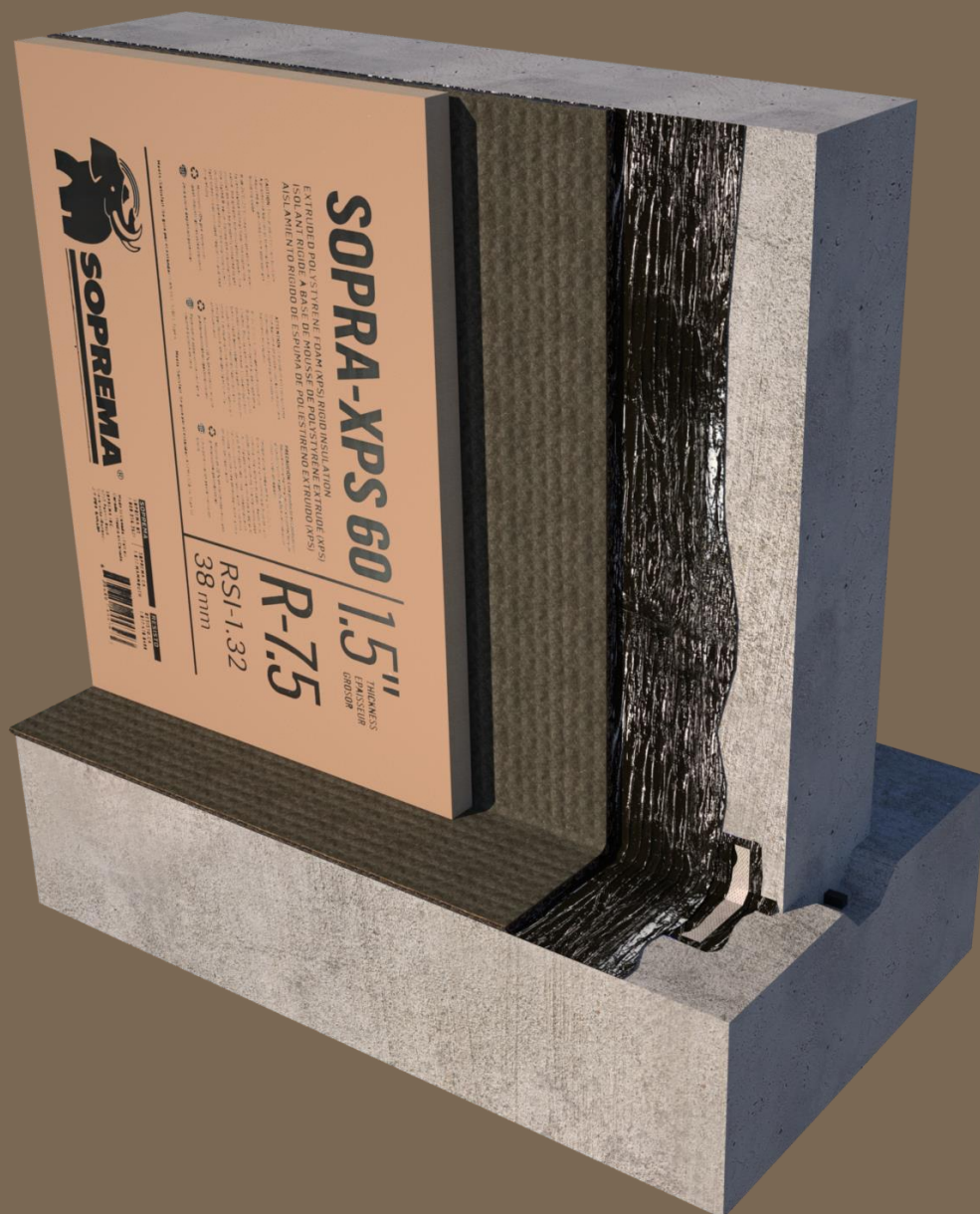


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INTRODUCTION

SOPREMA® COLPHENE® LM BARR is designed for positive-side, below-grade foundation wall waterproofing applications. COLPHENE® LM BARR is produced using moisture-cured STPE technology, which is ideal for new “green” structural concrete containing high relative humidity (RH). COLPHENE® LM BARR is applied directly to suitable concrete substrates without the need for primers. COLPHENE® LM BARR has very low odor and contains very low VOC’s to meet environmental restrictions and other sensitive job site requirements. COLPHENE® LM BARR waterproofing is rain-proof within hours of application, and is ready to for insulation and/or protection course materials in 24 hours or more based upon project conditions.

COLPHENE® LM BARR is applied using a brush, roller or squeegee. COLPHENE® LM BARR SPRAY is spray-applied and may be applied using a brush, roller or squeegee. For foundation walls, COLPHENE® LM BARR and COLPHENE® LM BARR SPRAY may be unreinforced. POLYFLEECE is used to reinforce COLPHENE® LM BARR at cracks, joints, transitions, penetrations and terminations. COLPHENE® BARR FLASHING is an accessory material that is tooled/trowel-applied at transitions, penetrations and terminations. Protection course materials and/or insulation are applied to protect COLPHENE® LM BARR waterproofing before back-filling over the foundation.

The “COLPHENE® LM BARR BELOW-GRADE WATERPROOFING TECHNICAL MANUAL” is intended to offer guidance to SOPREMA® authorized contractors and design professionals. The manual provides specific instructions and details for SOPREMA® below-grade foundation wall waterproofing. 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® below-grade foundation wall waterproofing when a SOPREMA® warranty is requested. 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 below-grade 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:

- 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.
- Ensure project conditions are satisfactory to proceed the cleaning, repair and preparation work.
- 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.

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 allowed to cure 3 to 7 days, and the surface should be dry to the touch, in order to apply COLPHENE® LM BARR. Concrete cure time varies based on project environment. Comply with the project's concrete specifications for cure time.
 - 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 (RH) is acceptable for COLPHENE® LM BARR materials.
 - Concrete should be water cured. Concrete curing compounds and concrete admixtures may inhibit adhesion. If curing compounds are required, sodium silicate is preferred.
 - Curing compounds and concrete admixtures must be compatible with COLPHENE® LM BARR materials. Mechanically abrade/remove all incompatible curing compounds from the concrete surface.
 - The concrete finish should be wood-float, wood trowel and light broom finish. The concrete should NOT have a hard, smooth finish where COLPHENE® LM BARR materials are applied. Smooth surfaces should be mechanically abraded where concrete is too smooth to achieve an acceptable bond.
 - 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 surfaces are free of mortar spills, concrete debris and foreign materials.
 - Examine concrete substrates to ensure surfaces have a uniform surface profile. Concrete Surface Profile (CSP) 2 to 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 repaired using appropriate concrete repair materials and methods such as epoxy or repair mortars.
- Minor irregularities may be addressed by pretreated the surface 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 COLPLHENE® 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 minimum 1 inch (2.54 cm) wide x 12 inch (30.48 cm) long strips of [POLYFLEECE](#) reinforcing fabric. Larger samples are desirable.
 - 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 through, until the material is no longer wet and tacky.
 - 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 are desirable, and should measure 2 to 5 pounds per lineal inch of fabric. The samples should also demonstrate cohesive failure, with a significant amount of COLPLHENE® LM BARR remaining bonded to the substrate.

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 for COLPLHENE® LM BARR waterproofing.
 - 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 exposed aggregate, 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 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.
- Concrete repairs:
 - Refer to ASTM D5295, *Standard Guide for Preparation of Concrete Surfaces for Adhered (Bonded) Membrane Waterproofing Systems*, and the referenced concrete repair standards and guidelines.
 - Rough, pitted, porous concrete surfaces and other surface irregularities may result in pinholes in the COLPLHENE® LM BARR waterproofing. Surface irregularities must be repaired using appropriate concrete repair materials and methods such as epoxy or repair mortars.
- Minor irregularities:

- Small isolated irregularities that are 1/8 to 1/4 in deep, such as small spalls, pitting, voids, and holes may be pretreated using COLPHENE LM BARR waterproofing materials.
 - Clean and remove dust, debris and all loose materials from the irregularities.
 - Pretreat concrete irregularities using COLPHENE® LM BARR, [COLPHENE® BARR FLASHING](#), or [SOPRASEAL® SEALANT](#). Use brush, roller or trowel to work-in the material, and bond the waterproofing material to the substrate.
 - Ensure substrates are pretreated to provide uniform surfaces before applying COLPHENE® LM BARR waterproofing.
 - For cracks up to 1/4 in, reinforce the COLPHENE® LM BARR materials using [POLYFLEECE](#) reinforcement.

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.
- Before applying COLPHENE® LM BARR, ensure conditions are acceptable to proceed. Refer to Section 1.1 SUBSTRATE EVALUATION, CLEANING, REPAIR AND PREPARATION.
- SOPREMA recommends first installing COLPHENE® LM BARR reinforced flashings at penetrations and transitions before installing the COLPHENE® LM BARR waterproofing. 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 sufficiently within one day, ready for additional work 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) before applying subsequent materials.
 - COLPHENE® LM BARR should be fully protected from UV exposure.

Flashing Preparation:

- Ensure penetrations and transitions 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 reinforced COLPHENE® LM BARR flashings, pre-cut the [POLYFLEECE](#) reinforcing fabric to conform to penetrations and transitions. 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 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 ft 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.
 - Flat blade or 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 minor concrete irregularities by working-in 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](#)
- Flashings at corners and angles at transitions and terminations may be reinforced or non-reinforced. Refer to Table 2.2b for minimum total thickness and warranty requirements.
- Transitions at foundation walls and footings:
 - Refer to [Figure 2.1a](#) and [Figure 2.1b](#) below.
 - For all inside angle transitions, 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.
 - For reinforced flashings at angle transitions, 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.

- These fundamentals apply to other similar waterproofing transition details.
- Penetrations:
 - Refer to [Figures 2.1c and 2.1d](#) 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 flashing detail 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 Inspection:

- Each day, physically inspect all COLPHENE® LM BARR flashings before concealing the flashings with the waterproofing membrane.
- 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.

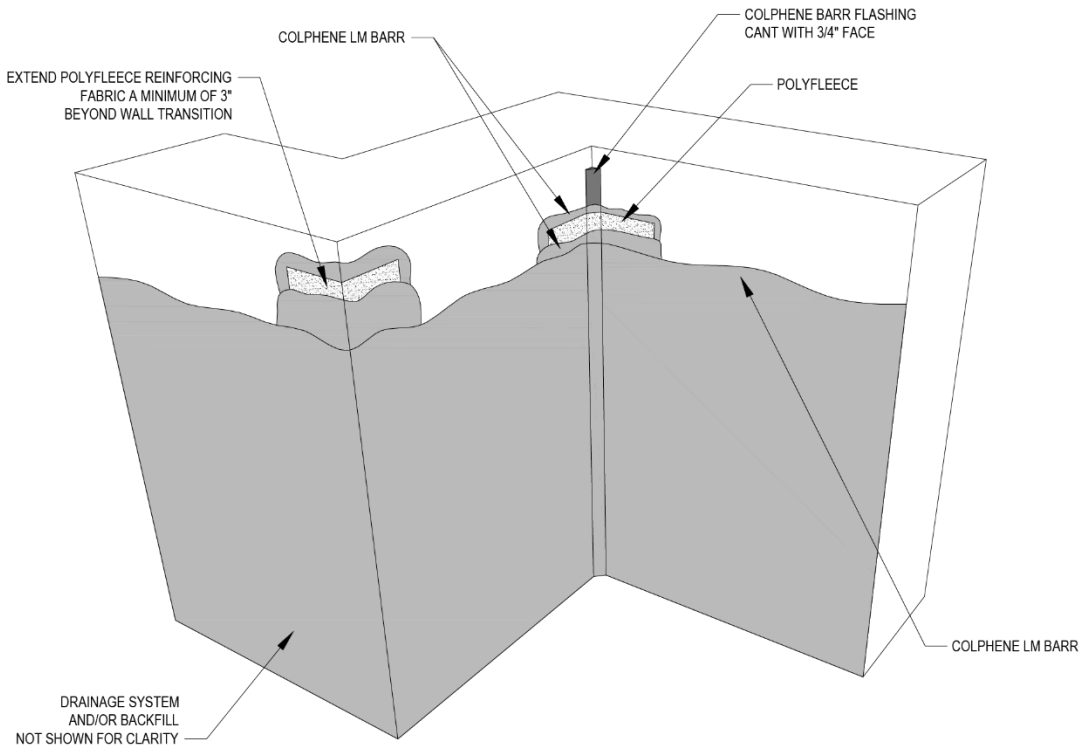


Figure 2.1a Non-Reinforced COLPHENE® LM BARR At Inside/Outside Corners

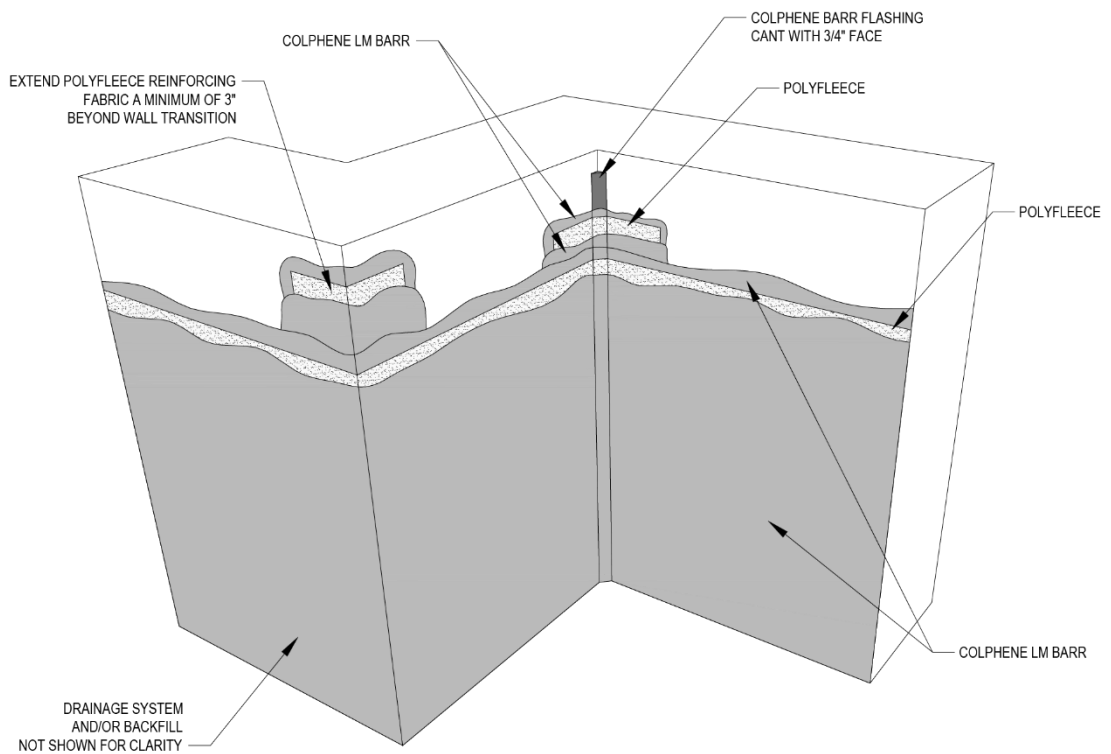


Figure 2.1b Reinforced COLPHENE® LM BARR At Inside/Outside Corners

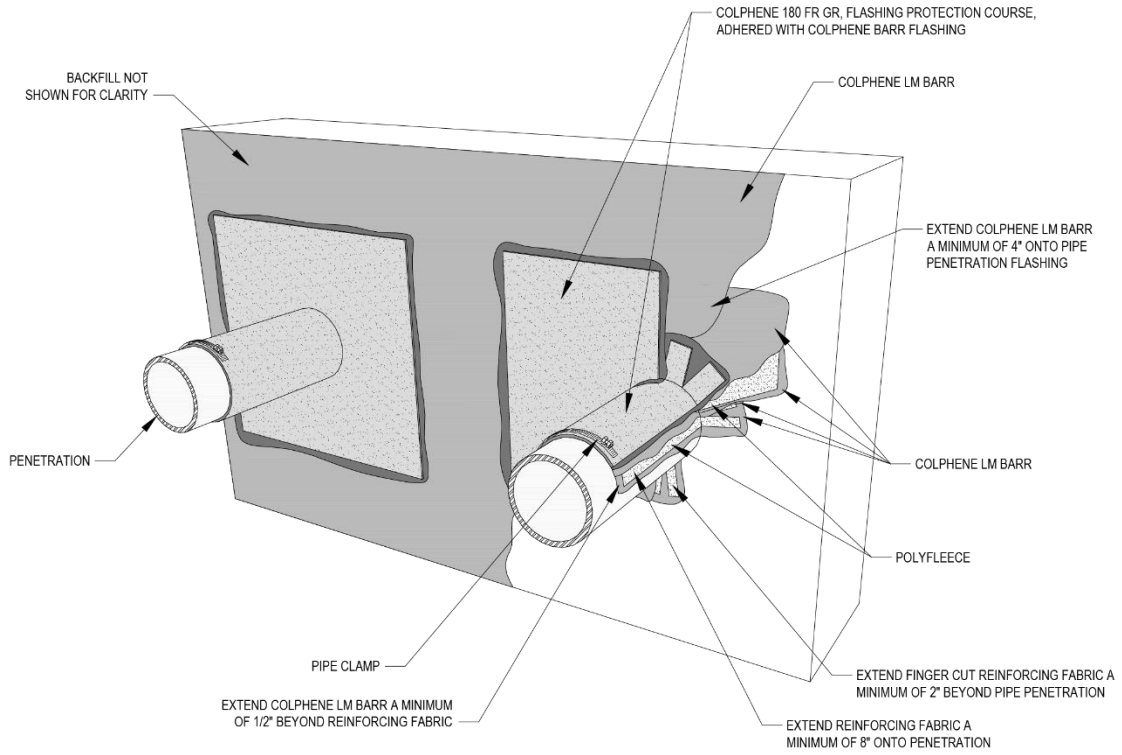


Figure 2.1c Non-Reinforced COLPHENE® LM BARR At Penetrations

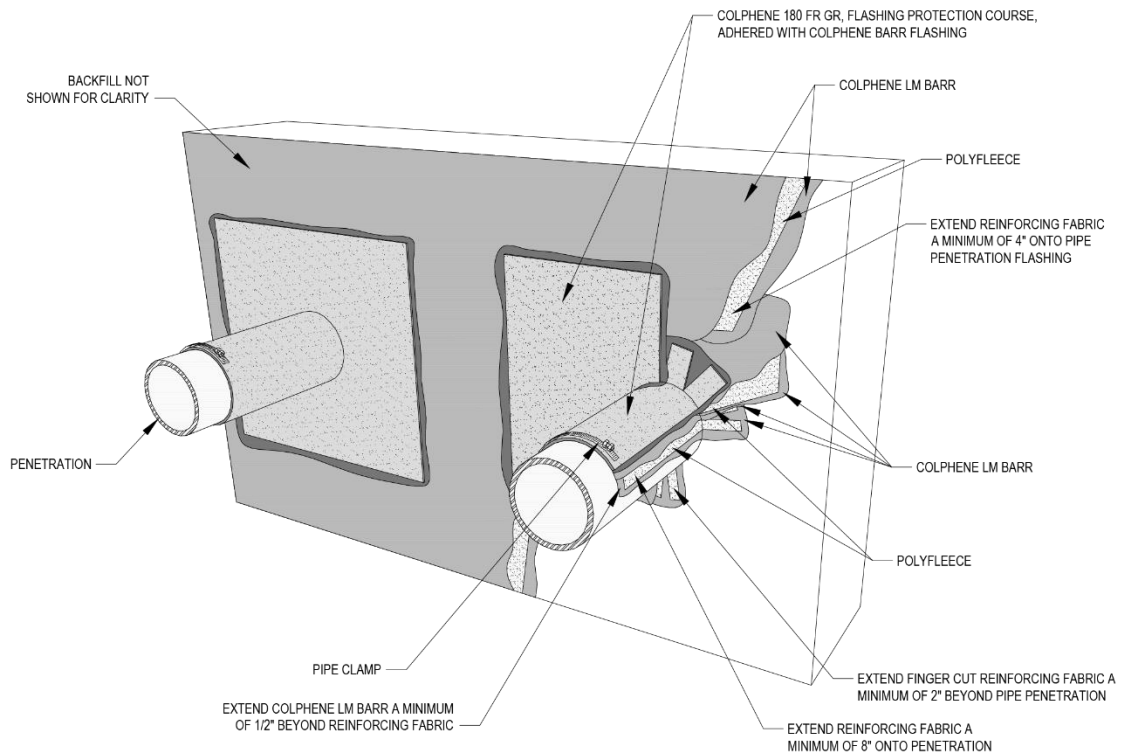


Figure 2.1d Reinforced COLPHENE® LM BARR At Penetrations

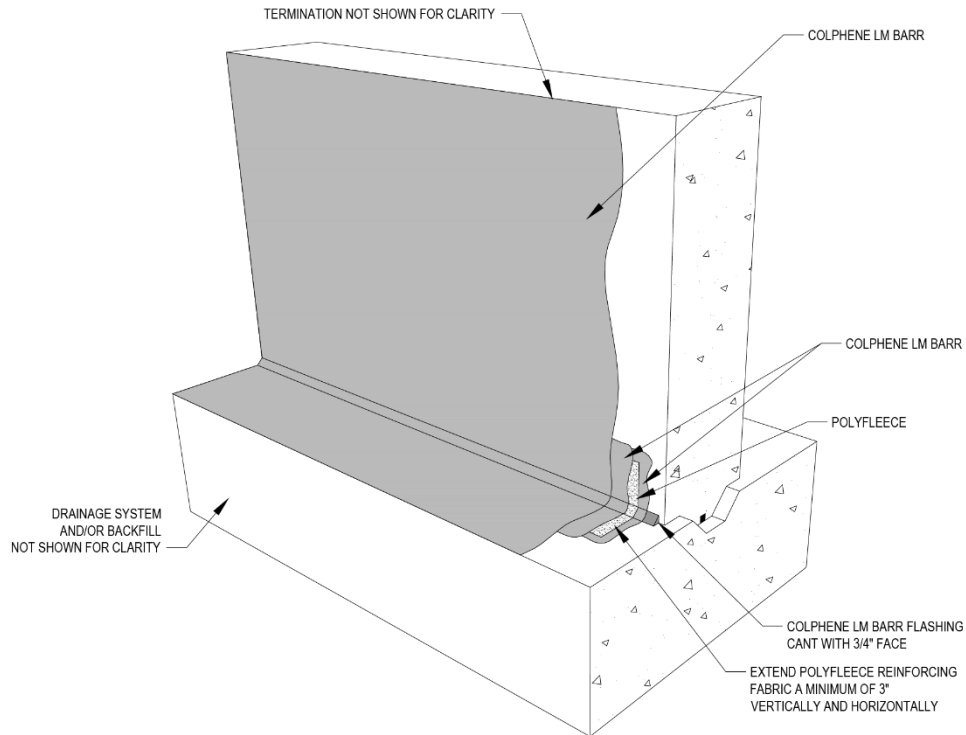


Figure 2.1e Non-Reinforced COLPHENE® LM BARR At Transitions

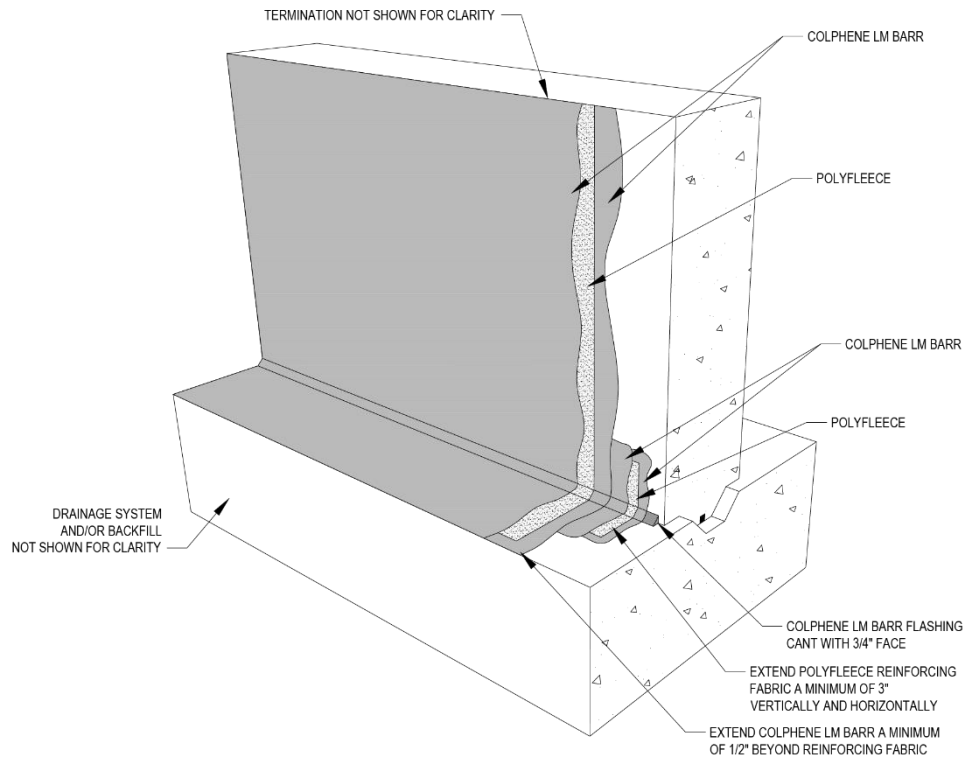


Figure 2.1f Reinforced COLPHENE® LM BARR At Transitions

2.2 WATERPROOFING MEMBRANE

General:

- COLPHENE® LM BARR (brush, roller or squeegee-grade) or COLPHENE® LM BARR SPRAY (spray grade) may be used for wall foundation waterproofing and flashings.
- Before applying COLPHENE® LM BARR, ensure conditions are acceptable to proceed. Refer to Section 1.1 SUBSTRATE EVALUATION, CLEANING, REPAIR AND PREPARATION.
- The COLPHENE® LM BARR flashings are generally installed first at penetrations, termination and transitions before installing the COLPHENE® LM BARR waterproofing. 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 applying subsequent materials.
 - COLPHENE® LM BARR should be fully protected from UV exposure.
- 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 ft 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.
 - Flat blade or ¾ 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:

- Prepare and pretreat minor concrete irregularities by working-in 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 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.
 - Non-Reinforced Waterproofing:
 - Apply even, uniform layers of COLPHENE® LM BARR to the prepared substrate. Refer to Table 2.2b for minimum total thickness and warranty information.
 - Reinforced Waterproofing:
 - Where fully-reinforced waterproofing is required, 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.

Field membrane inspection:

- Each day, physically inspect all COLPHENE® LM BARR flashings before concealing the flashings with the waterproofing membrane.
- 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.

Table 2.2b COLPHENE® LM BARR Warranty Term & Membrane Thickness

SOPREMA Warranty	Warranty Term	Minimum Thickness	Approximate Coverage Rate	Flashings
<u>Standard Below Grade Waterproofing Warranty, Form BG100</u>	5 years	60 mils unreinforced	3.7 gals/100 ft ²	All flashings reinforced per details: 60 mil base layer/ <u>POLYFLEECE</u> /60 mil top coat Totaling 120 mils. (2 layers @ 3.7 gals/100 ft ² totaling 7.4 gals/100 ft ²)
<u>Standard Below Grade Waterproofing Warranty, Form BG100</u>	10 years	120 mils unreinforced	7.4 gals/100 ft ²	All flashings reinforced per details: 60 mil base layer/ <u>POLYFLEECE</u> /60 mil top coat Totaling 120 mils. 2 layers @ 3.7 gals/100 ft ² totaling 7.4 gals/100 ft ²)
<u>Standard Below Grade Waterproofing Warranty, Form BG100</u>	10 years *	120 mils: 60 mil base layer/ <u>POLYFLEECE</u> /60 mil top coat	7.4 gals/100 ft ²	All flashings reinforced per details: 60 mil base layer/ <u>POLYFLEECE</u> /60 mil top coat Totaling 120 mils. 2 layers @ 3.7 gals/100 ft ² totaling 7.4 gals/100 ft ²)
<u>Limited Product Replacement Warranty, Form LPR100</u>	5 years	60 mils unreinforced	3.7 gals/100 ft ²	Reinforcement is optional for flashings at transitions, terminations and corners. COLPHENE LM BARR FLASHING “45 degree cant” is applied at inside corners.

*Contact [SOPREMA®](#) for additional warranty terms.

3 MEMBRANE PROTECTION

3.1 PROTECTION COURSE, DRAINAGE, AND INSULATION

General:

- Foundation wall drainage system requirements are determined by the project designer to meet specific building and site requirements.
- Refer to [Table 3.1a](#) for options, and the links to the SOPREMA US website for product data sheets and specific product information.
- COLPHENE® LM BARR waterproofing requires a protection course, drainage mat and/or insulation board to protect the waterproofing from potential damages resulting from backfilling, ground water and other related exposures. A combination of the protection course, drainage mat, and insulation board may be installed to meet specific project requirements.
- Protection course:
 - Before installing the protection course, 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.
 - DO NOT use fasteners to attach the protection course through the waterproofing. If fasteners are used, they must be installed above the waterproofing layer. Fasteners installed as a temporary measure must be removed and the holes repaired using COLPHENE® LM BARR waterproofing materials.
 - The protection course may be adhered to fully cured COLPHENE® LM BARR waterproofing as indicated below, or the protection course may be loose-laid and held in place using back-fill materials where appropriate.
 - Ensure the COLPHENE® LM BARR has been thoroughly inspected and all deficiencies corrected before applying the protection course. Refer to the *membrane inspection* section below.
- Drainage Mats:
 - Where appropriate for project conditions, drainage mats may serve as foundation wall drainage and waterproofing protection course. Refer to [Table 3.1a](#) below for drainage mat options.
 - The drainage mat may be installed in direct contact with the COLPHENE® LM BARR waterproofing, or installed over insulation or other protection course layer when required to meet project conditions.
 - Before installing the drainage mat, unroll the mat and cut the material to conform to foundation wall conditions. Refer to [Figure 3.1d](#), [Figure 3.1i](#), and [Figure 3.1n](#).
 - Apply the drainage mat to the substrate and ensure the filter fabric faces outward.
 - The drainage mat may be fastened along the top leading edge above the waterproofing layer only. DO NOT penetrate the COLPHENE® LM BARR waterproofing with fasteners.
 - [COLPHENE® BARR FLASHING](#) may be used in “spots” as needed to temporarily hold the drainage mat in place before backfill is ready to apply.
 - Overlap the fleece side-lap onto adjacent mat. Secure side-lap in place by spot adhering with SOPRAMASTIC SP1 or [COLPHENE® BARR FLASHING](#).
 - Fold filter fabric over ends of drainage mat at grade and footing terminations.
 - Tie filter fabric to penetrations. Refer to [Figure 3.1i](#).
 - The drainage mats should not be left exposed for an extended period. Exposure time varies based upon actual site environment and conditions.
- Insulation Boards:
 - Extruded polystyrene insulation complying with ASTM C578, *Standard Specification for Rigid Cellular Polystyrene Thermal Insulation*, may also serve as the waterproofing protection course. Refer to [Table 3.1a](#) below for SOPREMA insulation board options.
 - Cut insulation boards as needed to conform to the foundation wall conditions. Refer to [Figure 3.1e](#), [Figure 3.1j](#), and [Figure 3.1o](#).

- [COLPHENE® BARR FLASHING](#) may be used in “spots” as needed to temporarily hold the boards in place before backfill is ready to apply.
- Install the boards firmly in place, butt all joints tightly together. Hold polystyrene insulation back, away from any hot pipes or other heat sources that may penetrate the waterproofing.
- The extruded polystyrene boards should not be left exposed for an extended period. Exposure time varies based upon actual site environment and conditions.
- **SBS modified bitumen protection course:**
 - SBS modified bitumen membrane sheets may be used as the waterproofing protection course. Refer to [Table 3.1a](#) below for recommended options.
 - Unroll and cut the sheets to working lengths and widths to conform to conditions. Refer to [Figure 3.1a](#), [Figure 3.1f](#), and [Figure 3.1k](#).
 - Ensure side-laps and end-laps are maintained, and ensure the sheets are installed to cover and protect all COLPHENE® LM BARR surfaces.
 - The sheets may be loose laid, partially adhered or fully adhered to the COLPHENE® LM BARR waterproofing surface. Refer to options in [Table 3.1a](#).
 - Overlap the sheets onto the flashing protection course to ensure the COLPHENE® LM BARR waterproofing is protected from direct contact with backfill materials. Refer to [Figure 3.1f](#).
 - When adhering the sheets, use a broom or roller to firmly set the sheets so they bond firmly in place.
 - The sheets may be fastened along the top leading edge above the waterproofing layer only. DO NOT penetrate the COLPHENE® LM BARR waterproofing with fasteners.
 - The SBS modified bitumen sheets should not be left exposed for an extended period. Exposure time varies based upon actual site environment and conditions.
- **[SOPRABOARD™](#) protection course:**
 - SOPREMA [SOPRABOARD™](#) may be used as the waterproofing protection course. Refer to [Table 3.1a](#) below for recommended options.
 - Cut the [SOPRABOARD™](#) materials to conform to the foundation wall conditions so that joints are butted tightly together.
 - Ensure the [SOPRABOARD™](#) is installed to cover and protect all COLPHENE® LM BARR surfaces. Refer to [Figure 3.1b](#), [Figure 3.1g](#), and [Figure 3.1l](#).
 - [SOPRABOARD™](#) may be loose laid, partially adhered or fully adhered to the COLPHENE® LM BARR waterproofing to temporarily hold the boards in place before backfill is ready to apply. Refer to [Table 3.1a](#).
 - When adhering [SOPRABOARD™](#), use a broom firmly set the board and bond it in place.
 - Overlap [SOPRABOARD™](#) onto the flashing protection course to ensure the COLPHENE® LM BARR waterproofing is not exposed. Refer to [Figure 3.1g](#).
 - The boards may be fastened along the top leading edge above the waterproofing layer only. DO NOT penetrate the COLPHENE® LM BARR waterproofing with fasteners.
 - [SOPRABOARD™](#) should not be left exposed for an extended period. Exposure time varies based upon actual site environment and conditions.
- **[COLPHENE® BSW PROTECT'R](#) field protection course:**
 - SOPREMA [COLPHENE® BSW PROTECT'R](#) may be used as the waterproofing protection course. Refer to [Table 3.1a](#) below for recommendations.
 - Unroll the sheet onto the substrate and allow time to relax.
 - Cut the sheet to working lengths and widths to conform to foundation wall conditions. Refer to [Figure 3.1c](#), [Figure 3.1h](#), and [Figure 3.1m](#).
 - 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 roller to firmly set the sheet in place.

- The sheets may be fastened along the top leading edge above the waterproofing layer only. DO NOT penetrate the COLPHENE® LM BARR waterproofing with fasteners.
- COLPHENE® BSW PROTECT'R should not be left exposed for an extended period. Exposure time varies based upon actual site environment and conditions.

Table 3.1a Below Grade Waterproofing Protection, Drainage Mat, and Insulation Board

Type	Component	Installation
Drainage Mat	<u>SOPRADRAIN™ 100</u>	Loose Laid (fastened at leading edge only, above waterproofing layer) and held in place using backfill materials
	<u>SOPRA DRAIN™ 102</u>	Partially adhered using spots of <u>COLPHENE® BARR FLASHING</u>
	<u>SOPRA DRAIN™ 104</u>	
	<u>SOPRADRAIN™ ECOVENT,</u> <u>SOPRADRAIN™ ECOVENT 2</u>	Loose Laid (fastened at leading edge only, above waterproofing layer) and held in place using backfill materials
		Partially adhered with spots of <u>COLPHENE® BARR FLASHING</u>
Insulation Board	<u>SOPRA-XPS 25</u>	Loose Laid, held in place using backfill materials
	<u>SOPRA-XPS 30</u>	
	<u>SOPRA-XPS 40</u>	Partially adhered using spots of <u>COLPHENE® BARR FLASHING</u>
	<u>SOPRA-XPS 60</u> <u>SOPRA-XPS 100</u>	
Protection Course	<u>COLPHENE® 180 SANDED,</u> <u>COLPHENE® SANDED</u>	Loose Laid (fastened at leading edge only, above waterproofing layer) and held in place using backfill materials
		Partially adhered using ribbons or spots of <u>COLPHENE® LM BARR,</u> <u>COLPHENE® LM BARR SPRAY</u> or <u>COLPHENE® BARR FLASHING</u>
		*Fully adhered with <u>COLPHENE® LM BARR</u> or <u>COLPHENE® LM BARR SPRAY</u> at 1.5 to 2 gallons per square
	<u>SOPRABOARD™ 1/8",</u> <u>SOPRABOARD™ 1/4"</u>	Loose Laid (fastened at leading edge only, above waterproofing layer) and held in place using backfill materials
		Partially adhered using ribbons or spots of <u>COLPHENE® LM BARR,</u> <u>COLPHENE® LM BARR SPRAY</u> or <u>COLPHENE® BARR FLASHING</u>
		Fully adhered using <u>COLPHENE® LM BARR,</u> <u>COLPHENE® LM BARR SPRAY</u> or <u>COLPHENE® BARR FLASHING</u> at 1.5 to 2 gallons per square
	<u>COLPHENE® BSW PROTECT'R</u>	Self-adhered. Fastened at leading edge only, above waterproofing layer, and held in place using backfill materials

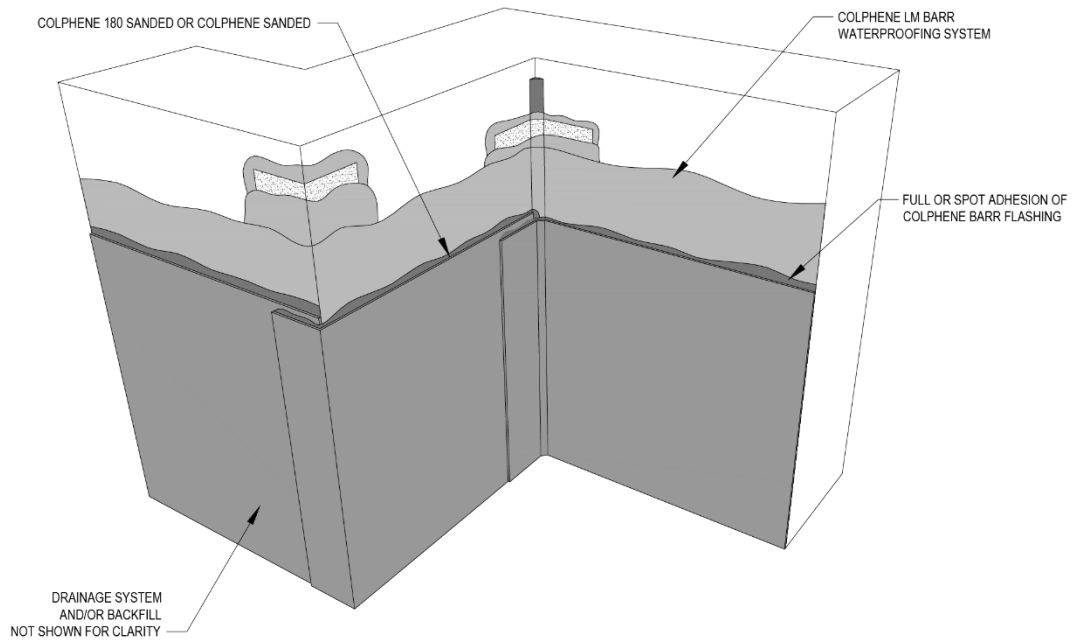


Figure 3.1a COLPHENE® SANDED or COLPHENE® 180 SANDED Protection Course At Inside/Outside Corners

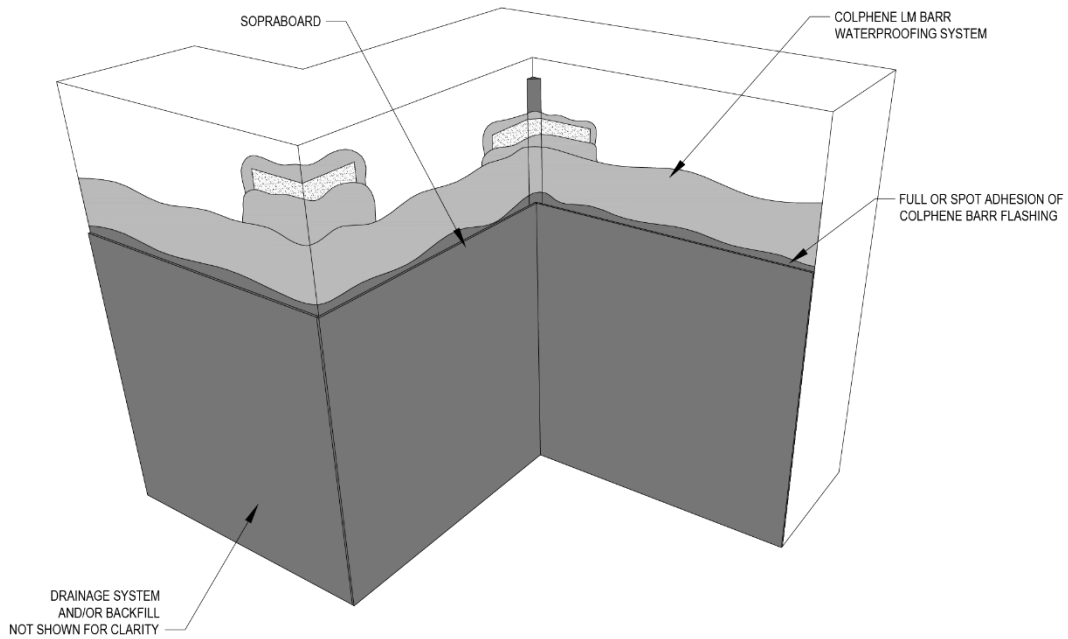


Figure 3.1b SOPRABOARD™ Protection Course At Inside/Outside Corners

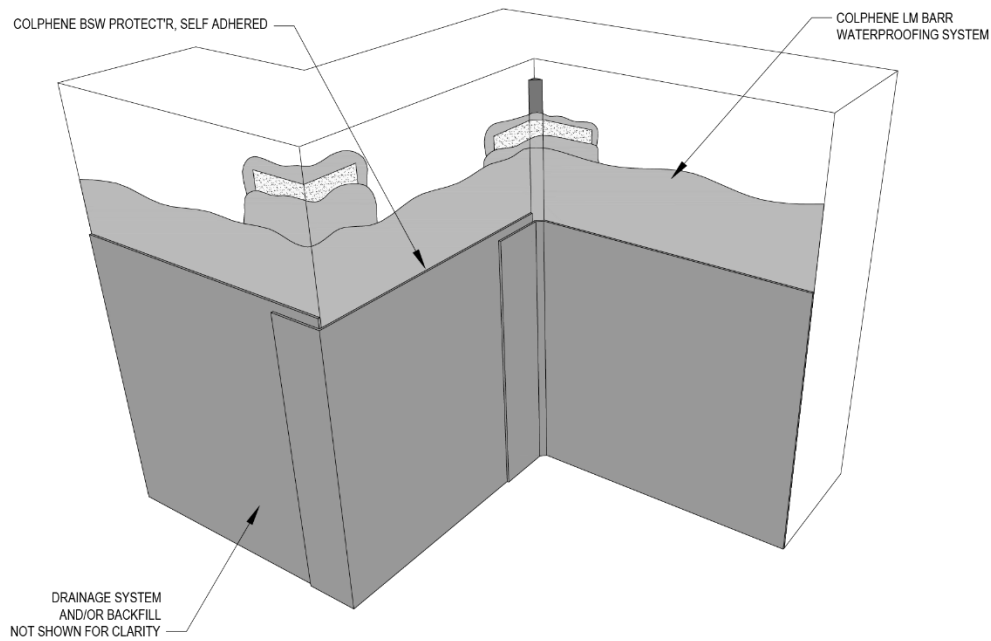


Figure 3.1c COLPHENE® BSW PROTECT'R Protection Course At Inside/Outside Corners

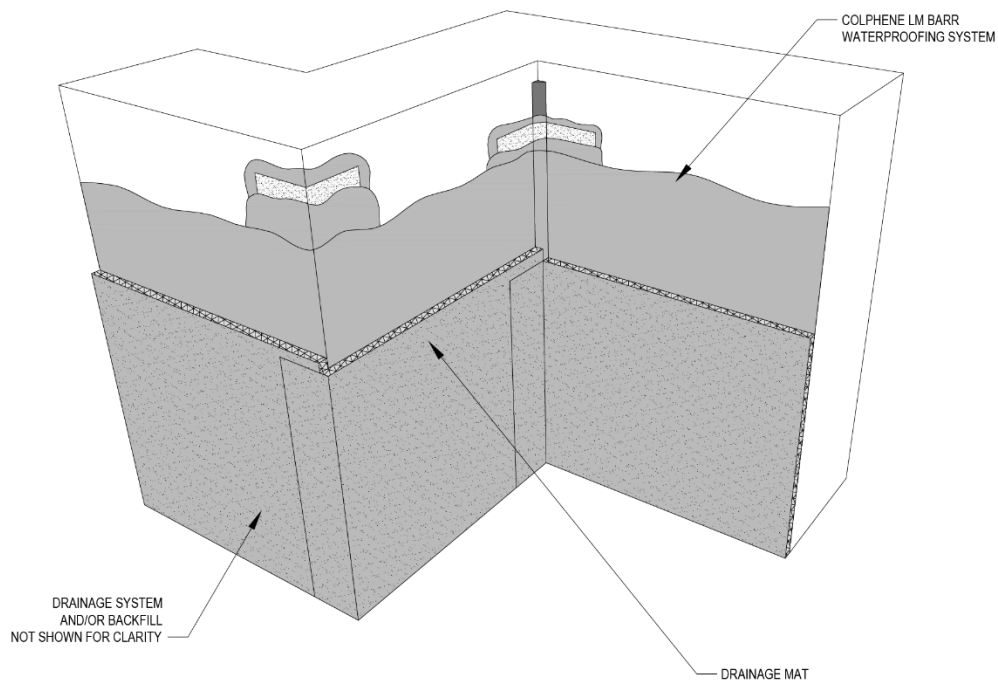


Figure 3.1d Drainage Mat Protection Course At Inside/Outside Corners

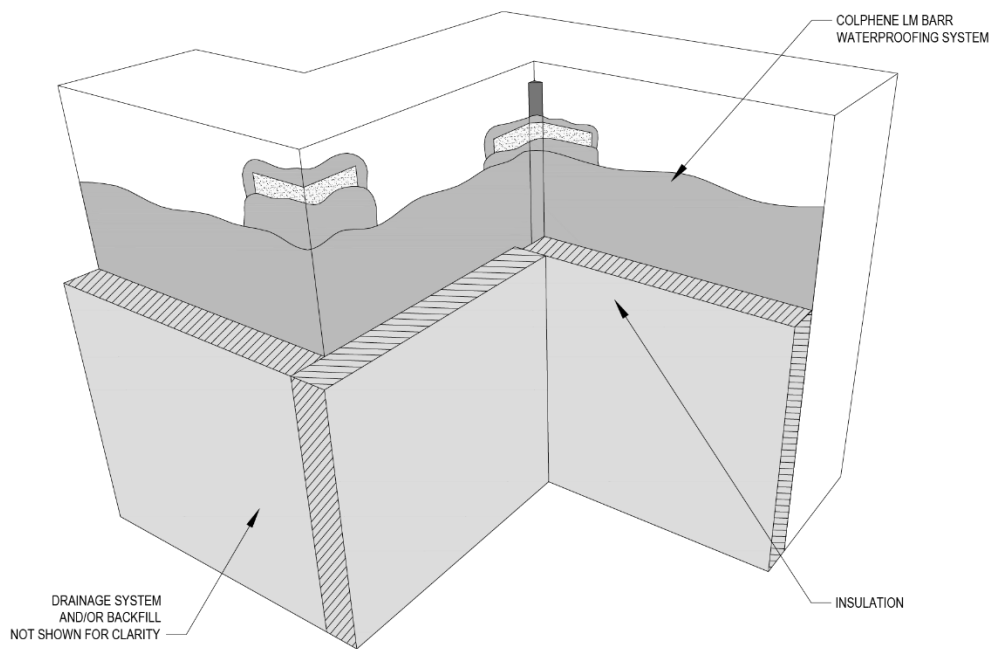


Figure 3.1e Extruded Polystyrene Protection Course At Inside/Outside Corners

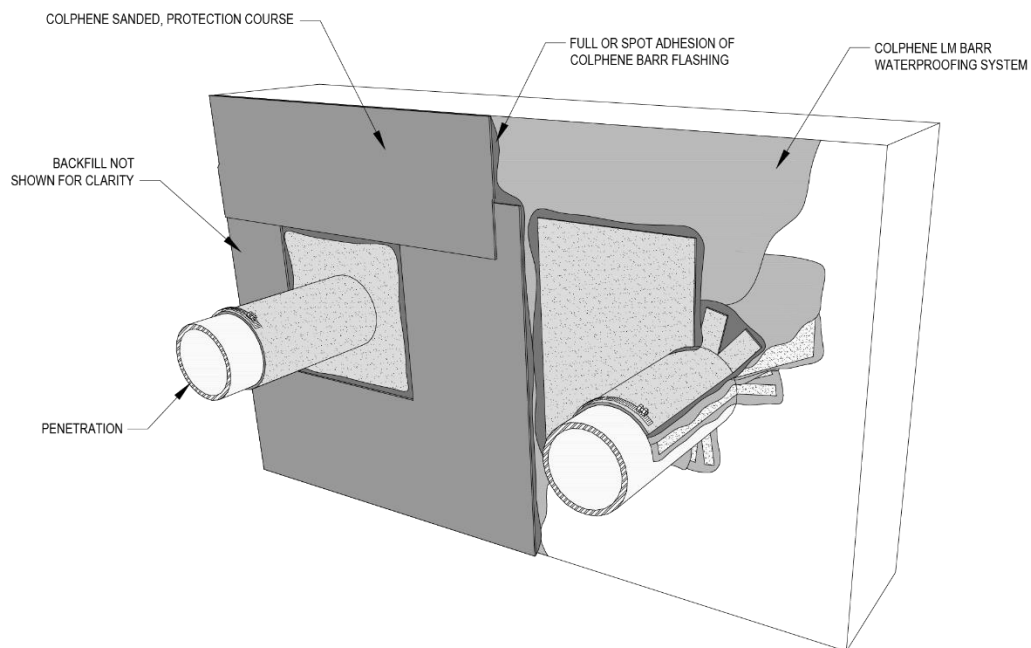


Figure 3.1f COLPHENE® SANDED or COLPHENE® 180 SANDED Protection Course At Penetrations

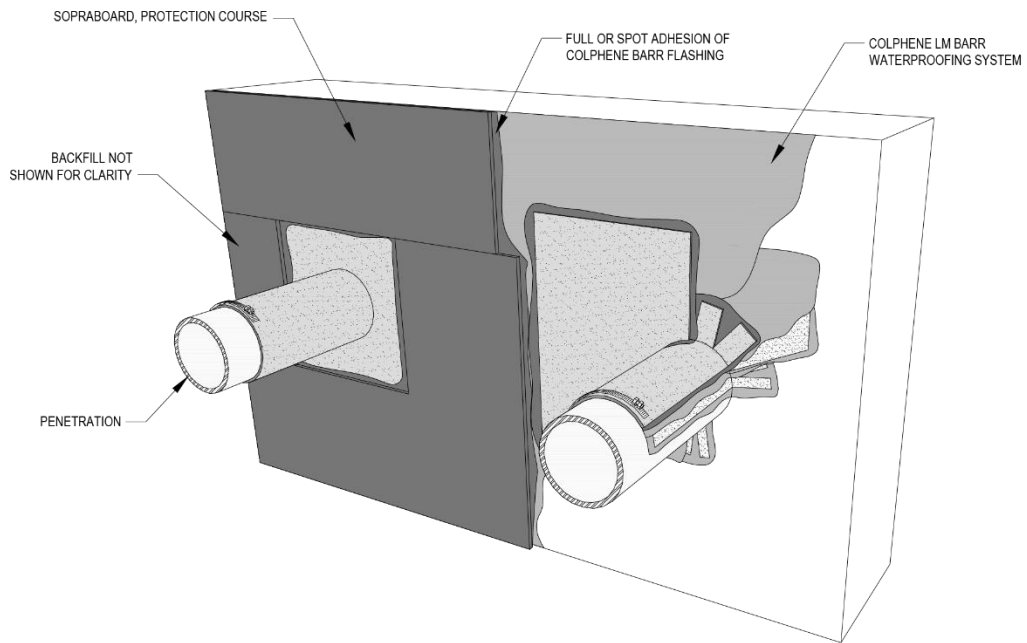


Figure 3.1g SOPRABOARD™ Protection Course At Penetrations

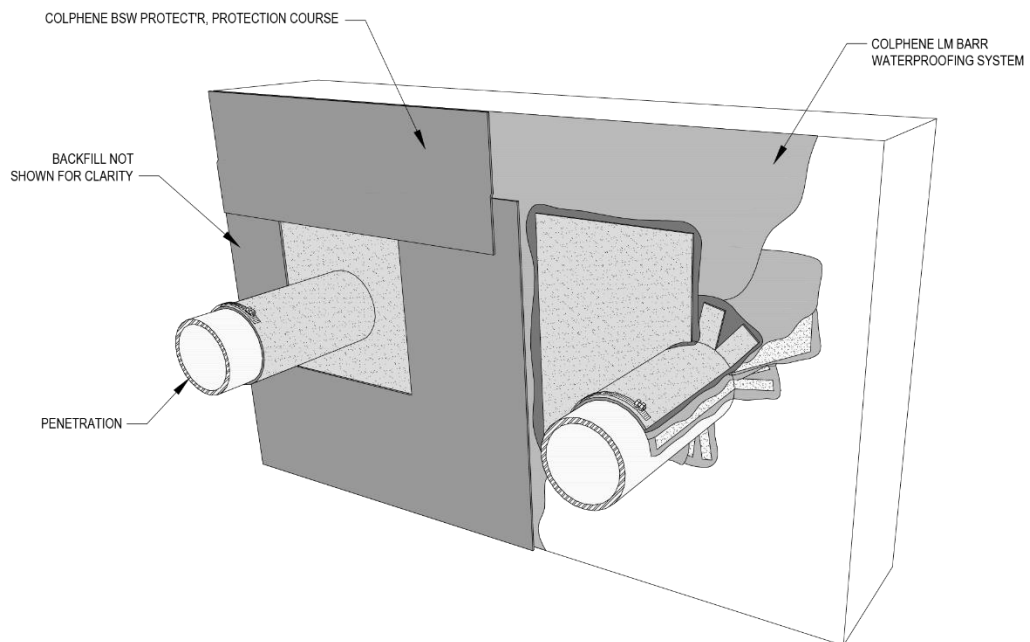


Figure 3.1h COLPHENE® BSW PROTECT'R Protection Course At Penetrations

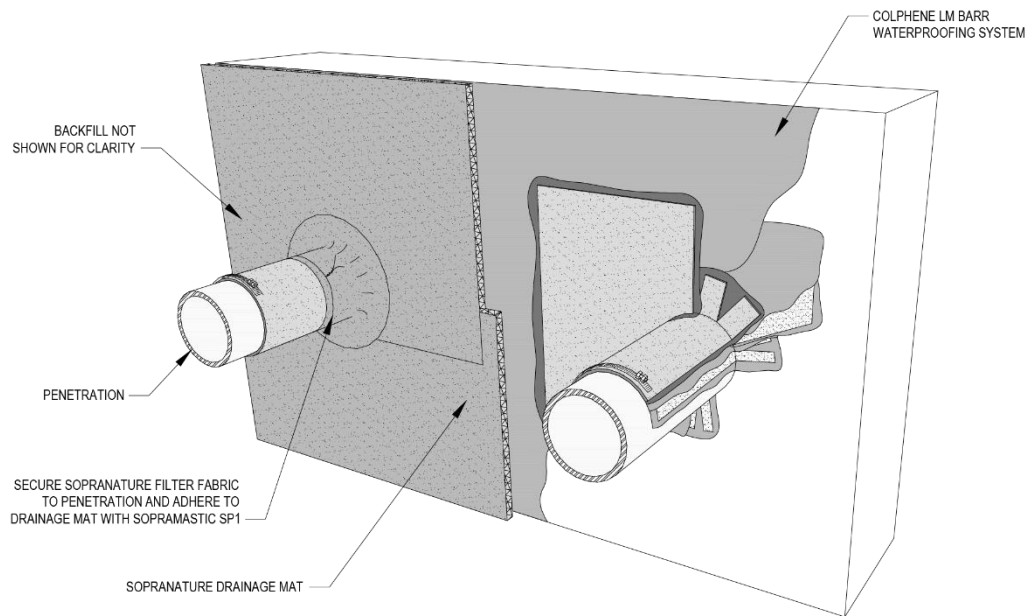


Figure 3.1i Drainage Mat Protection Course At Penetrations

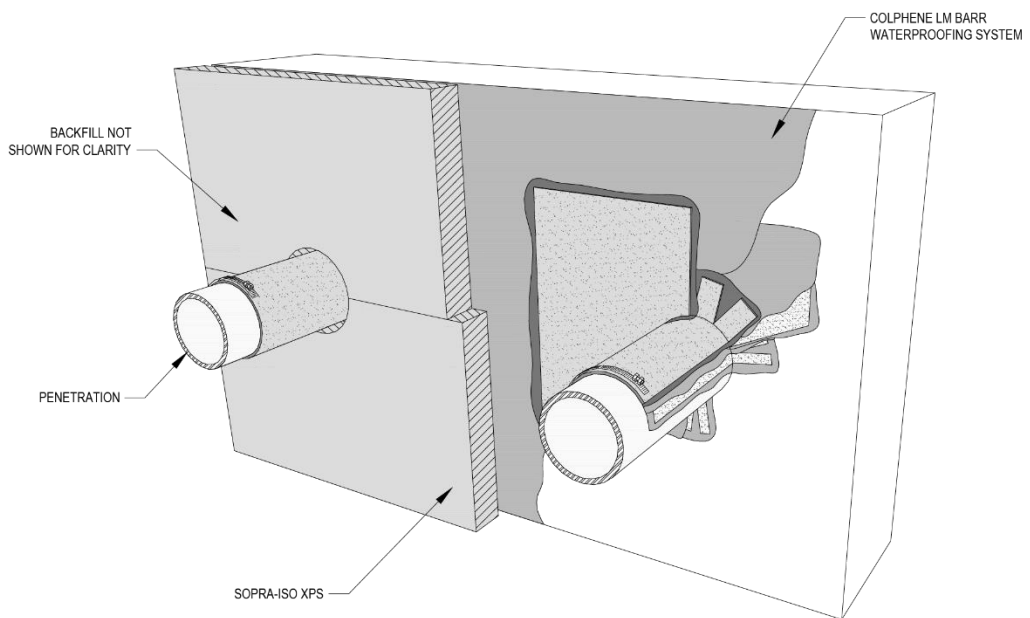


Figure 3.1j Extruded Polystyrene Protection Course At Penetrations

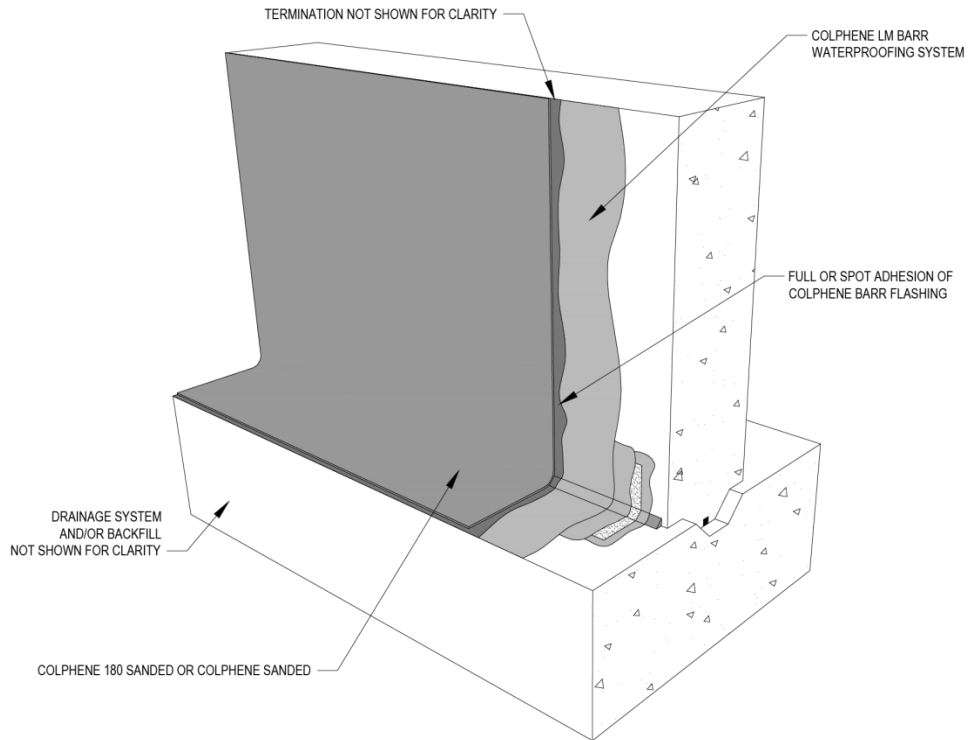


Figure 3.1k COLPHENE® SANDED or COLPHENE® 180 SANDED Protection Course At Transitions

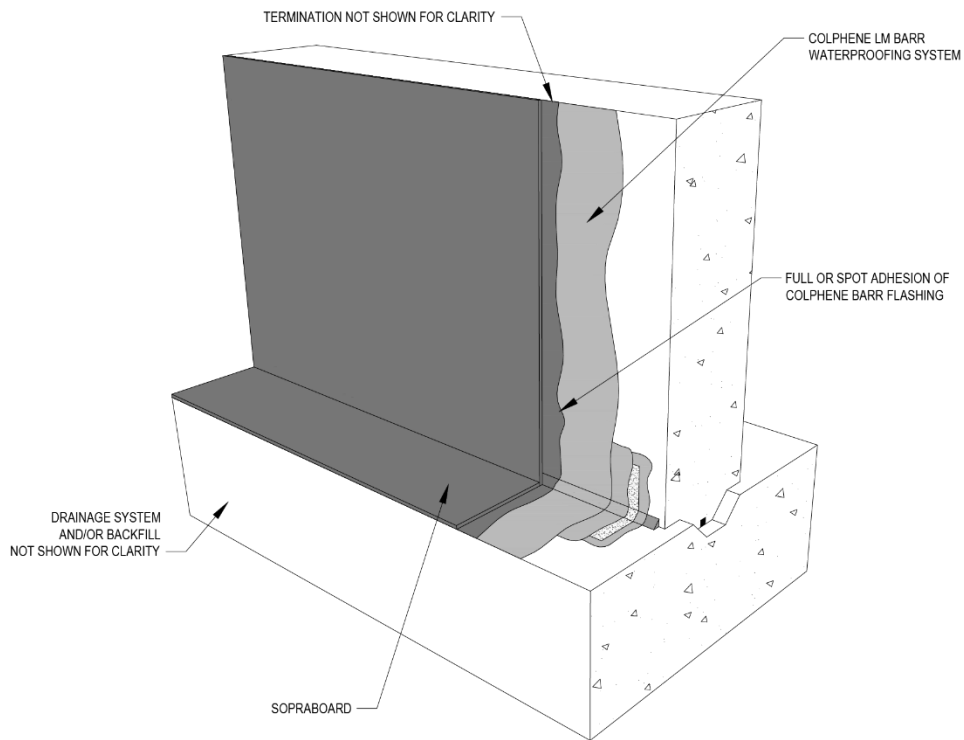


Figure 3.1l SOPRABOARD™ Protection Course At Transitions

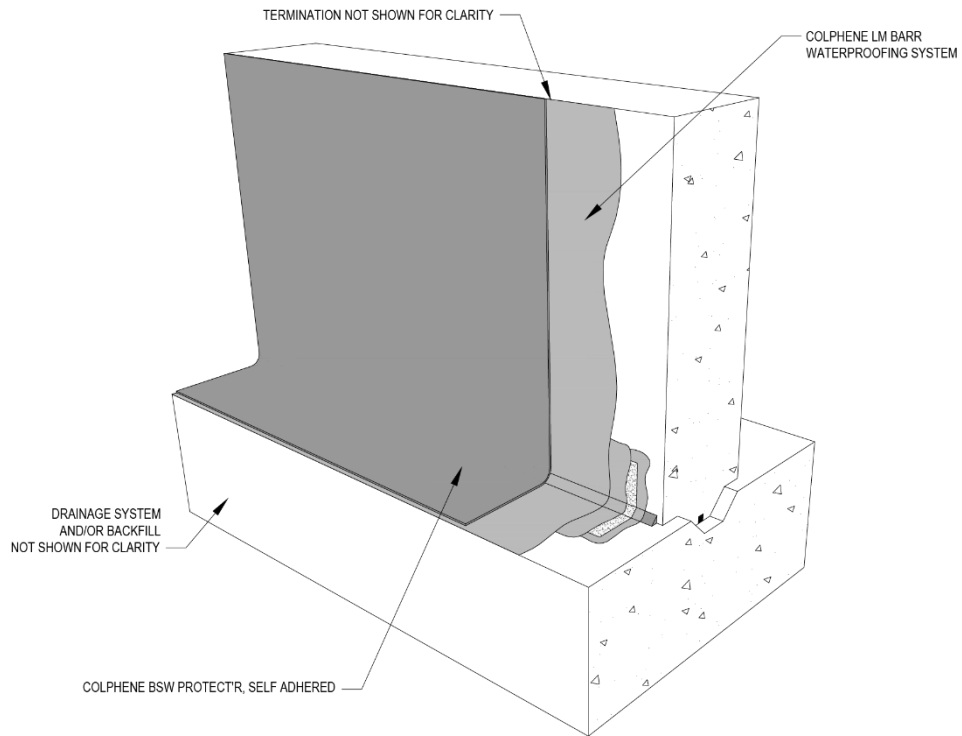


Figure 3.1m COLPHENE® BSW PROTECT'R Protection Course At Transitions

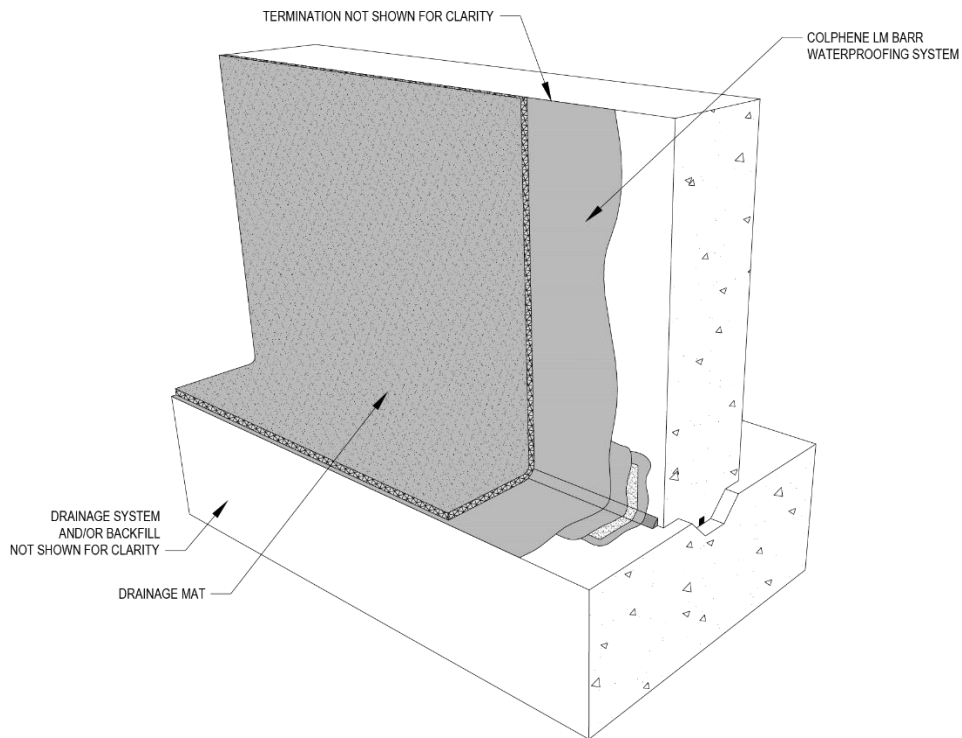


Figure 3.1n Drainage Mat Protection Course At Transitions

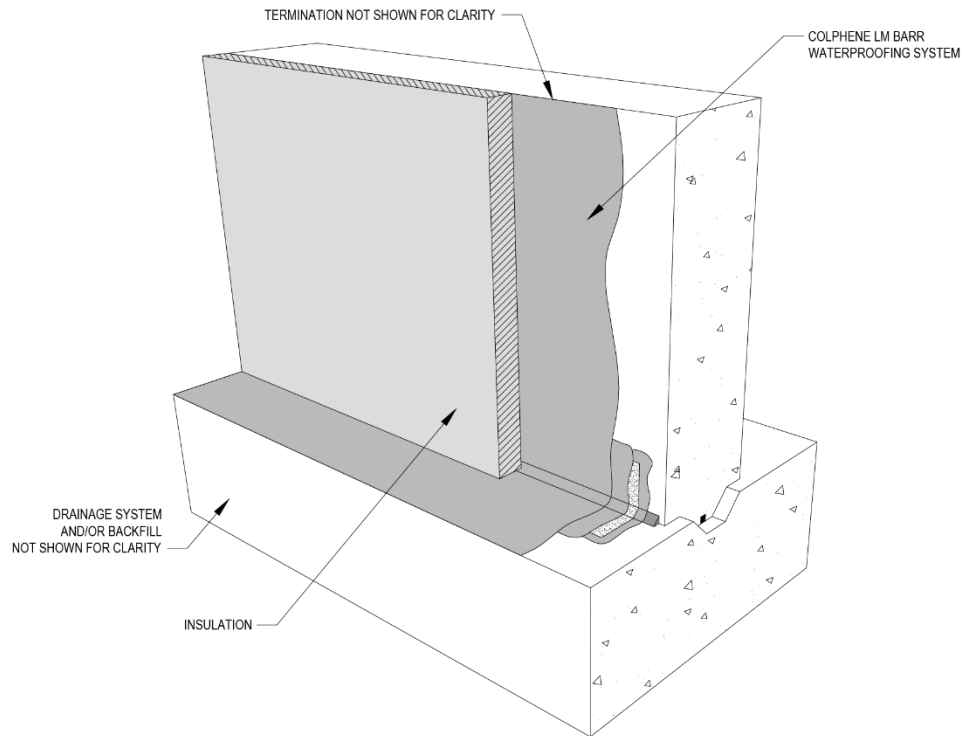


Figure 3.1o Extruded Polystyrene Protection Course At Transitions

4 MISCELLANEOUS

4.1 COLPHENE® LM BARR WATERPROOFING MATERIALS AND ACCESSORIES

General:

- [Table 4.1a](#) provides a general description of COLPHENE® LM BARR waterproofing materials and accessories. Refer to the Product Data Sheets and Safety Data Sheets for additional product information.

<i>Table 4.1a COLPHENE® LM BARR Waterproofing Materials and Accessories</i>	
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. 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. 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 and 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 protection course materials. 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 adhering waterproofing protection course materials. Applied using a notched trowel. Packaged in 3.5 gallon (13 L) pails.

*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.

4.2 COLPHENE® LM BARR TIE-INS

General:

- COLPHENE® LM BARR waterproofing materials used for vertical, positive-side foundation walls may be applied at tie-ins to SOPREMA walls and waterproofing materials. Refer to [Figures 4.2a and 4.2b](#).

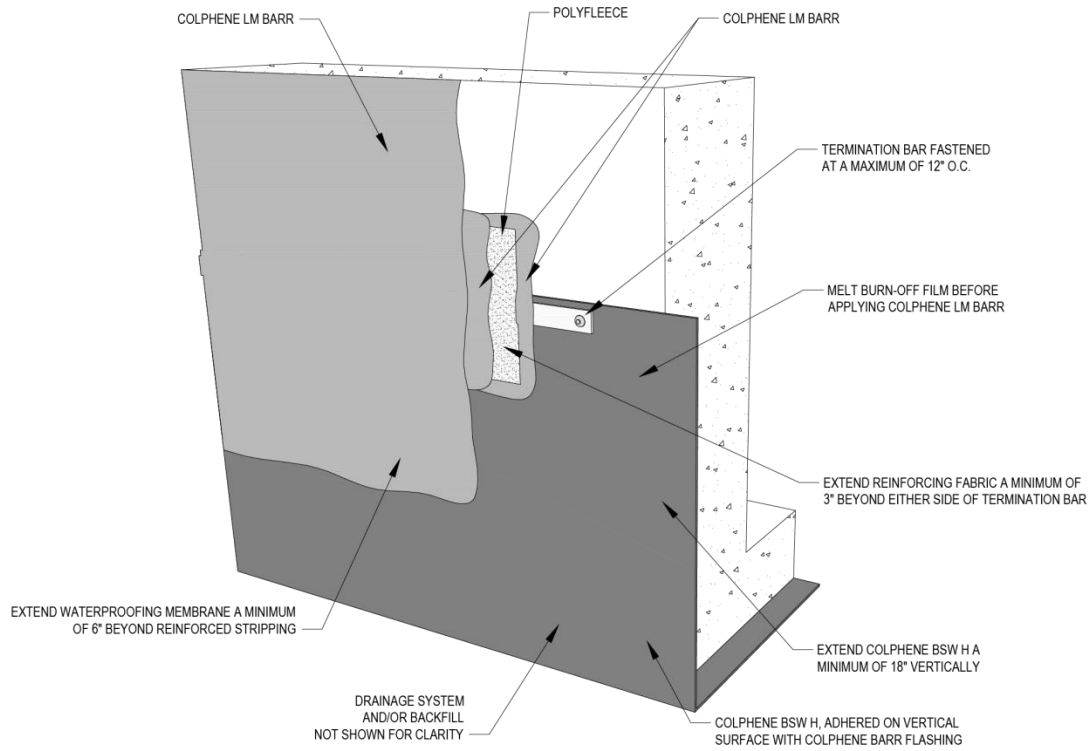


Figure 4.2a Non-reinforced Tie-In to Blindsided Waterproofing Membrane

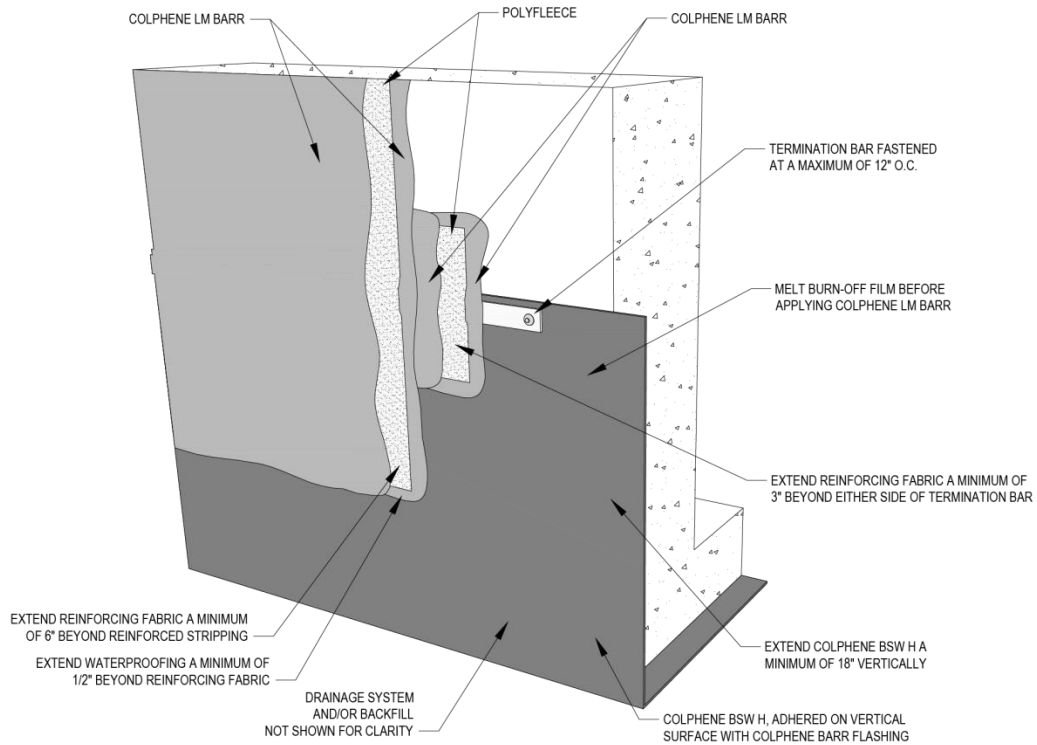


Figure 4.2b Reinforced Tie-In to Blindsided Waterproofing Membrane