

SCIENCE. SERVICE. SOLUTIONS.



CCW MIRAPLY™

Field Guide

MiraPLY with SeamLOCK™
Technology

Robust
Seam

Fully Bonded Waterproofing
Technology

Tenacious
Bond

Tough &
Durable

Engineered for Rugged
Site Conditions

Puncture
Resistant

Reinforced
70-mil Sheet

Installer
Friendly

Efficient
Application

Technical Services

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Safety Related Information

SAFETY

- Information on handling, storage and safety considerations including personal protection is available in the Safety Data Sheets (SDS's) and are available at www.carlisleccw.com
- Carefully read the products' Technical Data Sheets, product labels and SDS's prior to use
- Be aware of your surroundings and those working in adjacent areas

FIRST AID MEASURES

If exposed or concerned, get medical advice/attention.

MiraPLY-H, MiraPLY-V, MiraPLY Seam Tape, MiraPLY Detail Tape and MiraPLY Tieback Cover:	
Inhalation	Cannot be inhaled under normal circumstances.
Skin	Repeated contact with skin may result in irritation due to adhesive nature of product. Protective creams may be useful. If skin irritation occurs, get medical advice/attention.
Eyes	Cannot get into eyes under normal circumstances
Ingestion	Cannot be ingested under normal circumstances

CCW-703-V Liqueiseal:	
Inhalation	Remove person to fresh air and keep comfortable for breathing. If experiencing respiratory symptoms: Call a POISON CENTER/doctor.
Skin	Wash with plenty of soap and water. Take off contaminated clothing and wash before reuse. Immediately call a POISON CENTER or doctor/physician
Eyes	Rinse cautiously with water for 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists, get medical advice/attention.
Ingestion	Do NOT induce vomiting. If swallowed, get medical attention.

Sure-Seal® Lap Sealant:	
Inhalation	Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor if you feel unwell.
Skin	Remove/Take off immediately all contaminated clothing and wash it before reuse. Rinse skin with water/shower. If skin irritation occurs, get medical advice/attention.
Eyes	Flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists, get medical advice/attention.
Ingestion	Do NOT induce vomiting. If swallowed, get medical attention.

Safety Related Information

FIRE FIGHTING MEASURES AND OTHER SAFETY RELATED INFORMATION

Refer to the products' Safety Data Sheets

The information contained herein is based upon data and information available to Carlisle Coatings and Waterproofing Incorporated, and reflects our best professional judgment. This information is furnished upon the condition that the person receiving it shall make their own determination of the suitability of the material for their particular use.

MirapLY System Estimating Guide

Waterproofing Membranes and Accessories

Product Name	Description	Packaging	Coverage Rate
CCW Waterproofing Membranes			
CCW MirapLY-H	MirapLY-H with SeamLOCK Technology is a nominal, 70-mil horizontal grade, self-adhering, blindside waterproofing membrane. The dual laminate membrane fuses a 45-mil thick, reinforced TPO sheet to a 25-mil butyl adhesive coating.	4' x 50' (1.22 m x 15.24 m) rolls. Weight: 80 lbs (36 kg)	200 sq. ft./roll
CCW MirapLY-V	MirapLY-V with SeamLOCK™ Technology is a nominal 70 mil vertical grade, self-adhering, blindside waterproofing membrane. This membrane is a fully adhered composite comprised of a tough, durable and flexible 45- mil reinforced TPO backing with a 25-mil butyl alloy membrane/adhesive.	4' x 50' (1.22 m x 15.24 m) rolls. Weight: 80 lbs (36 kg)	200 sq. ft./roll
CCW Tie-Back Cover	CCW Tie-Back cover is a pre-formed, high-impact resistant, heavy-duty thermoplastic cover designed to protect the waterproofing membrane integrity. The CCW Tie-Back cover is an integral part of the CCW MirapLY system. CCW Tie-Back Covers are designed to provide a pre-formed tie-back cover shaped to cover most tie-back conditions and can withstand both concrete and shotcrete placement.	Sold Individually	N/A

MiraPLY System Estimating Guide

Waterproofing Membranes and Accessories

Product Name	Description	Packaging	Coverage Rate
CCW Waterproofing Membranes (continued)			
CCW Sure-Seal Term Bar	Extruded Aluminum Termination Bar	50 pcs; 500 LF(152 m) per carton 69 lbs. (31 kg) carton	1" (25 mm) wide x 10' (3 m) long
CCW HP-250 Primer	Apply the primer with a clean HP Splice Wipe. Scrub the area of the membrane in a circular motion to achieve a thin, even coating on the membrane.	1-gallon (3.8 L) cans 5-gallon (9.5 L) pails	Approximately 250 sq/ft (23 m2) per
CCW CAV-GRIP	Connect gun to hose and connect hose to cylinder. CAV-GRIP can be applied at ambient temperature of 25°F and up. Propellant in cylinders needs to be maintained above 60°F for the product to spray well.	#40 aerosol cylinder, Fill weight: 30 lbs of adhesive	Varies

MirAPLY System Estimating Guide

MirAPLY Accessories

Product Name	Description	Packaging	Coverage Rate
CCW Waterproofing Membranes			
CCW Seam Tape	MirAPLY Seam Tape is a double-sided tape with a tough, conformable carrier and aggressive adhesive system for sealing and holding to difficult-to-stick-to surfaces under a variety of conditions.	Roll - 75' x 6" 8 rolls per carton	37.5 sq. ft./roll
CCW Detail Tape	MirAPLY Detail Tape is a reinforced butyl-based, fabric-faced detailing tape for use with MirAPLY. MirAPLY Detail Tape offers an aggressive grip and remains flexible during application, ensuring immediate adhesion on contact and long-term bonding. The pressure sensitive properties of MirAPLY Detail Tape allow for a fast, clean and easy application.	Roll - 50' X 6" 8 rolls per carton	25 sq. ft./roll
CCW-703-V	CCW-703-V is a two-component polyurethane PRODUCT. It is self-curing, forming a seamless, impermeable coating that bonds tightly to an appropriate substrate, preventing the lateral transfer of water. CW 703 V is easily mixed at the jobsite and applied using a squeegee, trowel, or BRUSH.	3.5 gal Part A 0.5 gal Part B 45 lbs/unit	Varies upon use; reference Tech Data Sheet

MiraPLY System Estimating Guide

MiraPLY Accessories

Product Name	Description	Packaging	Coverage Rate
CCW Detailing Sealants/Mastics (continued)			
CCW Universal Sealant	Carlisle's Universal Single-Ply Sealant is a 100% solids, solvent-free, one-part polyether sealant that provides a weather-tight seal. Universal Single-Ply Sealant can be used as a sealant above Termination Bar or cut edges.	24 Cartridges, 10.1 Fl. Oz. (298 mL) each	25' (7.6 m) per tube or 600' (183 m) per carton using a 1/4" (8 mm) bead
CCW Lap Sealant	Sure-Seal Lap Sealant is an extremely durable material. Its cured rubber consistency enables it to expand and contract with the movement of the membrane without cracking or loss of adhesion.	25 tubes/carton	22' (6.7 m) per tube or 256' (78m) per gallon using 5/16" (8mm) bead
CCW Weathered Membrane Cleaner	Sure-Seal Weathered Membrane Cleaner is used to clean the CCW MiraPLY membrane prior to the seaming process. Sure-Seal Weathered Membrane Cleaner is solvent-based.	5 gallon pails 2 1-gallon closed top pail	Varies upon use; reference Tech Data Sheet

General Guidelines

COORDINATION

- Pre-construction meeting shall cover all decisions pertaining to design of waterproofing system to achieve a continuous, water-tight building structure.
- Review submittals, surface preparation, installation procedures, special details, sequence of construction, responsibilities, mock-up requirements, inspection, testing, protection of membrane, and repair procedures.
- Mock-up shall establish procedures and workmanship that must be maintained during installation.
- Review adjacent materials such as drains, doors, parapets, penetrations, and other site conditions for conformance to manufacturer's application instructions.
- Ensure proper dewatering system and techniques are in place prior to installation of the waterproofing system and remain in place until after concrete placement.

DELIVERY, STORAGE AND HANDLING

- Deliver CCW materials in original unopened packages.
- Protect CCW materials during transportation, storage, and installation to avoid physical damage.
- Store CCW materials in a cool dry area protected from direct sunlight and extreme heat.

SUBSTRATE REQUIREMENTS

- Before any waterproofing work is started the waterproofing applicator shall thoroughly examine all surfaces for any deficiencies. Should any deficiencies exist, the architect, owner, or general contractor should be notified in writing and corrections made.
- The substrate must be relatively even without noticeable high spots or depressions, relatively smooth, free of protrusions, debris, sharp edges or foreign materials and must be free of accumulated water, ice and snow. All substrates and detailed work areas including penetrations should be sound and stable to withstand traffic and concrete placement.
- Earth, crushed stone, or soil as a subbase shall be compacted such that the earth, stone or soil is not displaced from traffic or concrete placement. Typically, #57 stone compacted to 85% Proctor density provides a suitable substrate for MiraPLY. As per ACI 302 - "Concrete Floor and Slab Construction," the subbase should remain stable and support construction traffic.
- Concrete mud slabs or rat slabs shall be minimum 2" thick and be free of any exposed aggregate, loose debris or sharp protrusions. CSP-1 to CSP-6 finishes as per the ICRI2 Concrete Surface Profile Scale are acceptable to receive MiraPLY.
- Shoring Systems, Soil Retention Systems or support of excavation receiving MiraPLY shall be relatively smooth and even. The surface smoothness shall be CSP-1 to CSP-6 with a surface evenness no more than 1:15.
- MiraPLY can span voids and gaps up to 1".
- MiraDRAIN can span voids and gaps up to 2" and shall be installed over the subbase or against the shoring system prior to MiraPLY installation.

MiraPLY-H Installation

DESCRIPTION

MiraPLY-H with SeamLOCK Technology is a 70-mil horizontal grade, self-adhering, blindside waterproofing membrane. The dual laminate membrane fuses a 25-mil gray, butyl adhesive coating (top surface) to a 45-mil thick, black, reinforced TPO sheet (bottom surface). The top surface has a Factory-Applied-Tape (FAT™) providing the primary self-adhesive selvedge while the bottom surface has a pre-primed strip providing a secondary self-adhesive selvedge. Together, these dual self-adhesive selvedges create the MiraPLY's SeamLOCK technology.

INSTALLATION

- Start the installation at one corner of the building. Unroll the first sheet of MiraPLY-H square/parallel to the shoring system or formwork starting at one corner with the black TPO side facing down and the gray adhesive coating side facing up.
- Unroll the next sheet of MiraPLY-H lapping the SeamLOCK pre-primed strip onto the previously installed sheet a minimum of 3".
- Stagger end laps in open field areas and extend onto adjoining sheets a minimum of 3".
- Ensure that the membrane lays flat and no openings are visible.
- In cold weather installations, contact your local CCW Representative or CCW Technical Services at (888) 229-2199 for "Best Practices" and techniques.

SIDE LAPS

- At side laps, simultaneously remove the release liner on the factory applied tape and pre-primed strip then mate the two sheets together to form the SeamLOCK.
- Roll the side lap using a hard rubber roller and firm hand pressure.
- Avoid overlapping beyond the edge of the FAT; best practice is to have ⅛-¼" of exposed FAT adhesive along the length of the side lap.
- Refer to Detail MP-90.

END LAPS

- At end laps, ensure the TPO and adhesive coating surfaces are clean and free of debris and surface contaminants.
- Position 6" MiraPLY Seam Tape in the lap area and align with the end of a roll or a field cut. Roll MiraPLY Seam Tape using a hard rubber roller and firm hand pressure.
- With both release liners still in place, align the next roll of CCW MiraPLY over the Seam Tape. Avoid overlapping beyond the edge of the Seam Tape; best practice is to have a ⅛-¼" of exposed Seam Tape adhesive along the width of the end lap. Remove the release liner and join the two sheets together.
- After seam is fully constructed, roll the entire seam area with a hard rubber roller using firm hand pressure.
- The T-joints formed at either end of the end lap shall be sealed with a 6" x 6" patch of MiraPLY Detail Tape. Align the patch over the center of the T-joint, remove the release liner and roll into place. Care should be taken to ensure the tape has adequate contact to all 3 sheets that formed a T-joint. This is best accomplished using a "V" roller or detail roller in addition to the hard rubber roller.
- Refer to Details MP-90 and MP-91

MiraPLY-V Installation

DESCRIPTION

MiraPLY-V with SeamLOCK Technology is a 70-mil vertical grade, self-adhering, blindside waterproofing membrane. The dual laminate membrane fuses a 25-mil gray, butyl adhesive coating (front surface) to a 45-mil thick, black, reinforced TPO sheet (back surface). The front surface has a Factory-Applied-Tape (FAT) providing the primary self-adhesive selvedge while the back surface has a pre-primed strip providing a secondary self-adhesive selvedge. Together, these dual self-adhesive selvedges create the MiraPLY's SeamLOCK technology.

INSTALLATION

- Start the installation at one corner of the building. Unroll the first sheet of MiraPLY-V and install it square/parallel to building wall centered in the corner with the black TPO facing the shoring system and the gray adhesive coating with release liner facing towards the installer.
- Align the next sheet of MiraPLY-V lapping the SeamLOCK pre-primed strip onto the previously installed sheet a minimum of 3".
- Stagger end laps in open field areas and extend onto adjoining sheets a minimum of 3".
- Ensure that the membrane lays flat and no openings are visible.
- Ensure that the membrane is not blousing, tenting, pillowing, etc. greater than 1" along shoring system, corners and other transitions.

SIDE LAPS

- At side laps, simultaneously remove the release liner edge of the preceding sheet and the release liner from the pre-primed strip of the subsequent sheet to mate the two sheets together to form the SeamLOCK.
- Roll the side lap using a hard rubber roller and firm hand pressure.
- Avoid overlapping beyond the edge of the FAT; best practice is to have $\frac{1}{8}$ -" of exposed FAT adhesive along the length of the side lap.
- Leave remaining release liner on MiraPLY-V until ready for steel reinforcement placement and concrete placement.
- Side laps shall be held back a minimum of 12" from any inside or outside corner.
- Refer to Detail Drawing MP-92 MiraPLY-V End and Side Lap.

END LAPS

- At end laps, ensure the TPO and adhesive coating surfaces are clean and free of debris and surface contaminants.
- Remove release liner from the field of the MiraPLY-V as necessary during installation to assist with detailing and fastening. Release liner may be replaced after detailing and fastening is complete but is required to be removed prior to steel reinforcement placement and concrete placement.
- Position 6" MiraPLY Seam Tape in the lap area and align with the end of a roll or a field cut. Roll MiraPLY Seam Tape using a hard rubber roller and firm hand pressure.
- With both release liners still in place, align the next roll of CCW MiraPLY over the Seam Tape. Avoid overlapping beyond the edge of the Seam Tape; best practice is to have a $\frac{1}{8}$ -" of exposed Seam Tape adhesive along the width of the end lap. Remove the release liner and join the two sheets together.

MiraPLY-V Installation

- After seam is fully constructed, roll the entire seam area with a hard rubber roller using firm hand pressure.
- The T-joints formed at either end of the end lap shall be sealed with a 6" x 6" patch of MiraPLY Seam Tape or Detail Tape. Align the patch over the center of the T-joint, remove the release liner and roll into place. Care should be taken to ensure the tape has adequate contact to all 3 sheets that formed a T-joint. This is best accomplished using a "V" roller or detail roller in addition to the hard rubber roller.
- Refer to Detail Drawing MP-92 MiraPLY-V End and Side Lap and MP-93 MiraPLY-V "T"-Joints.

MECHANICAL FASTENERS

- Fastener type and means to install the fastener is substrate-dependent. Fastener should be flush and tight with the surface of the MiraPLY-V once installed.
- Care should be taken not to over drive the fastener through the membrane.
- Install fasteners a minimum of 6" from the top or perimeter edges of MiraPLY-V at approximately 12" on-center.
- For membrane lengths greater than 8 ft., fasten the field of the MiraPLY-V at approximately 24" on-center.
- Avoid overdriven fasteners which can cause stress in the membrane and seams.
- Cover fastener heads with a minimum 6" x 6" piece of MiraPLY Seam Tape or MiraPLY Detail Tape. If fastener heads are not tight and flush to the surface of the MiraPLY, a minimum 3" x 3" patch of MiraPLY Seam Tape or MiraPLY Detail Tape shall be installed prior to the 6" x 6" patch.

Quality Assurance

PROTECTION

Coordination between various trades is essential to avoid unnecessary traffic to prevent damage to the membrane. Unavoidable traffic areas must be protected by placing temporary protection courses over the MiraPLY to prevent damage.

FIELD INSPECTIONS

Field inspections are recommended to confirm proper installation and detailing for the MiraPLY System and at critical stages of relevant work by other Trades. These “Hold Points” should be clearly understood and coordinated with the party responsible for inspections, the General Contractor, the Waterproofing Contractor and the relevant Trades. CCW recommends that the 1st Hold Point for each specific condition or sequence (aka “First Point of Verification”) is allotted ample time to review and make any necessary corrections for any unforeseen challenges.

MIRAPLY REPAIR

- The MiraPLY surrounding a damaged area should be cleaned with a cloth dampened with Weathered Membrane Cleaner and then allowed to dry.
- Repair slices, cuts and small punctures (½" or less) with MiraPLY Detail Tape.
- Repair larger areas with a piece of MiraPLY (patch) extending beyond damaged area a minimum of 6" in all directions. Install Seam Tape along the perimeter of the area to be patched, then position the patch onto the Seam Tape. Remove the release liner and roll the patch with a hard rubber roller using firm hand pressure. Note: remove release liner from the MiraPLY-V prior to any repairs.

MiraPLY Accessories

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MiraPLY Seam Tape

DESCRIPTION

MiraPLY Seam Tape is a primer-less, double-sided adhesive tape with a tough, conformable carrier and an aggressive adhesive. It is used with the MiraPLY System for sealing end laps, repair work and other various detailing conditions. It is primarily installed between overlapping sheets of MiraPLY.

INSTALLATION

- All surfaces to receive the Seam Tape must be clean. The Seam Tape will not adhere to dusty, dirty or contaminated surfaces.
- Unroll 2-3' of Seam Tape, align the tape and press the tape onto the surface of the MiraPLY membrane with firm, even hand pressure. Continue applying the tape for the required length for the detail condition. Roll the tape using a hard rubber roller and firm hand pressure.
- Position the overlapping MiraPLY over the Seam Tape. Remove the tape's release liner and roll the MiraPLY using a hard rubber roller and firm hand pressure. Ensure 1/8-1/4" of exposed tape extends beyond the edge of overlapping MiraPLY.
- Tape to tape seams should be overlapped a minimum of 3".
- Care should be taken so that the tape lays flat and no openings are visible.

MiraPLY Detail Tape

DESCRIPTION

MiraPLY Detail Tape is a primer-less, one-sided adhesive tape with a tough, conformable carrier and an aggressive adhesive. It is used with the MiraPLY System for sealing seams, repair work and other various detailing conditions. It is intended to be installed on top of the MiraPLY System.

INSTALLATION

- All surfaces to receive the Detail Tape must be clean. The Detail Tape will not adhere to dusty, dirty or contaminated surfaces.
- Unroll 2-3' of Detail Tape, align the tape, remove 6-12" of release liner and press the tape onto the surface of the MiraPLY System with firm, even hand pressure. Continue to remove the release liner and apply the tape for the required length for the detail condition. Roll the tape using a hard rubber roller and firm hand pressure.
- Tape to tape seams should be overlapped a minimum of 3".
- Care should be taken so that the tape lays flat and no openings are visible.

CCW-703-V LIQUISEAL®

DESCRIPTION

CCW-703-V liquid-applied waterproofing membrane is a two-component polyurethane waterproofing system. It is self-curing, forming a seamless, impermeable coating that bonds tightly to an appropriate substrate, preventing the lateral transfer of water. It is used with the MiraPLY System as the liquid detailing component for various detailing conditions.

MIXING

- Remove the lid from the Part-A container and pour the entire contents of Part-B into the Part-A container. The CCW-703 material comes as a “kit” and is intended to be mixed as a complete unit and not as partial mixes.
- Use a variable-speed ½" drill with mixing paddle. Avoid using a high shear mixing blade as they may entrap air in the material.
- Insert the mixing paddle into the materials. Start to mix the materials manually by plunging the mixing paddle up and down a few times.
- Anchor the container to avoid spills before mixing. Slowly increase the speed of the mixing drill until the materials easily mix with one another.
- Mix for a minimum of 5 minutes and until there are no visible streaks of the Part-B.
- Pot life at 40° to 60°F is 1-2 hours. Pot life at 80°F is 1/2 - 1 hour.

INSTALLATION

- Apply CCW MiraPLY Seam Tape onto MiraPLY-H and MiraPLY-V prior to applications of CCW-703-V.
- As soon as the CCW-703-V is mixed, apply directly to the MiraPLY Seam Tape or substrate in a uniform application.
- Use a squeegee, trowel or brush to achieve a minimum thickness of 60-mil.
- Refer to detail drawings for specific thickness and dimensions.

Sure-Seal® Lap Sealant

DESCRIPTION

Sure-Seal Lap Sealant is a single-component sealant which dries to the touch in approximately 30 minutes depending on thickness of application and weather conditions. It is used with the MiraPLY System for various detailing conditions.

INSTALLATION

- Install the Lap Sealant as shown in the CCW Detail Drawings.
- All surfaces to be sealed with Lap Sealant must be firm, dry and free of oil, dust and other foreign materials.

CCW Tie-Back Cover

DESCRIPTION

CCW Tie-Back Cover is a pre-formed, high-impact resistant, heavy-duty thermoplastic detailing accessory for the MiraPLY System. It is intended to detail most tie-back heads or soil anchors and is designed to withstand both concrete and shotcrete placement.

INSTALLATION

- Ensure the CCW Tie-Back Cover fits over the tie-back assembly.
- Install MiraPLY-V within 1" of the base of the tie-back. If installing a MiraPLY-V target piece over the center of the tie-back, ensure that the target piece will extend a minimum of 6" beyond the perimeter of the Tie-Back Cover; this is easily done with a 4' x 4' target piece of MiraPLY-V centered over the tie-back.
- Peel off enough of the MiraPLY-V release liner around the tie-back to install Tie-Back Cover. Center the Tie-Back Cover over the tie-back head and mechanically fasten into place.
- Fastener type and means to install the fastener is substrate-dependent. The goal for a given shoring system is to identify a fastener that will provide a tight, flush head to the surface of the Tie-Back Cover.
- Care should be taken not to over drive the fastener through the Tie-Back Cover.
- Install a minimum of (6) fasteners: (4) at the corners and (1) centered on either side. Fasteners should be located within 1" from the edge of the Tie-Back Cover
- When necessary use CCW primer / contact adhesive to promote adhesion of CCW Detail Tape to the CCW Tie-Back Cover.
- Seal all (4) edges of the Tie-Back Cover to the MiraPLY-V with MiraPLY Detail Tape.
- Care should be taken to not remove the Tie-Back Cover once installed in-place as this will cause damage to the MiraPLY-V.

Sure-Seal Termination Bar

DESCRIPTION

The Sure-Seal Termination Bar is an extruded aluminum bar designed for securing and sealing flashing and membrane terminations in accordance with current Carlisle Specifications. It is used with the MiraPLY System for various detailing conditions.

INSTALLATION

Install termination bar by fastening 12" on-center maximum with a fastener compatible with the substrate to achieve constant compression. Start fastening at one end of the bar and proceed to the next slot (12" max.) to eliminate bowing caused by improper installation. The termination bar will be sealed but sealant type and dimensions will vary depending on the detailing condition. Refer to detail drawings for more information.

Sure-Seal Weathered Membrane Cleaner

DESCRIPTION

Sure-Seal Weathered Membrane Cleaner is solvent-based and is used to clean CCW MiraPLY membranes prior to the seaming process. Sure-Seal Weathered Membrane Cleaner is also used to clean and prepare existing membrane for tie-ins and seam construction.

INSTALLATION

Remove all foreign materials with damp rag. Saturate a clean, absorbent, natural fiber rag with the cleaner. Thoroughly scrub the membrane to be sealed in the seaming process. Change the rag periodically to prevent recontamination of membrane surface and refresh frequently with cleaner (typically 15 –20 feet). Allow the membrane surface to dry completely before proceeding with the seaming process.

MiraPLY Detail Drawings

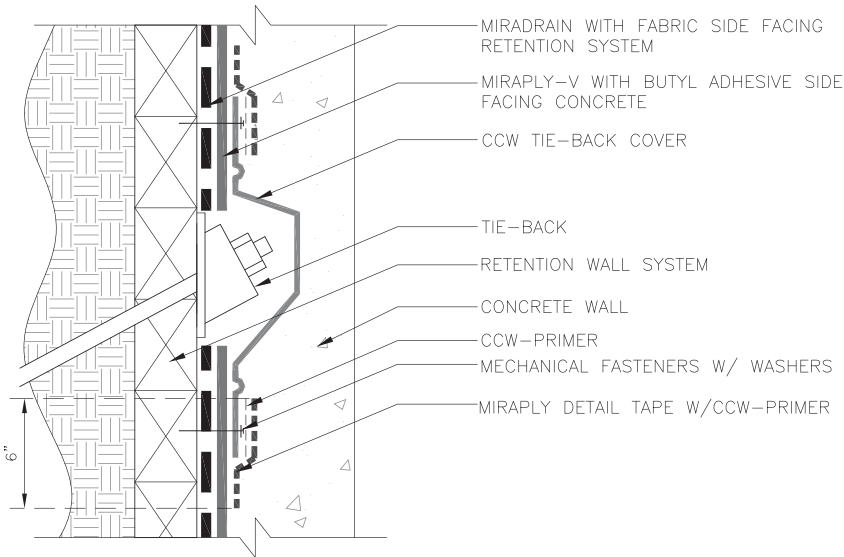
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MiraPLY Detail Drawings

MiraPLY-V Tie Back Cover

(MP-10)



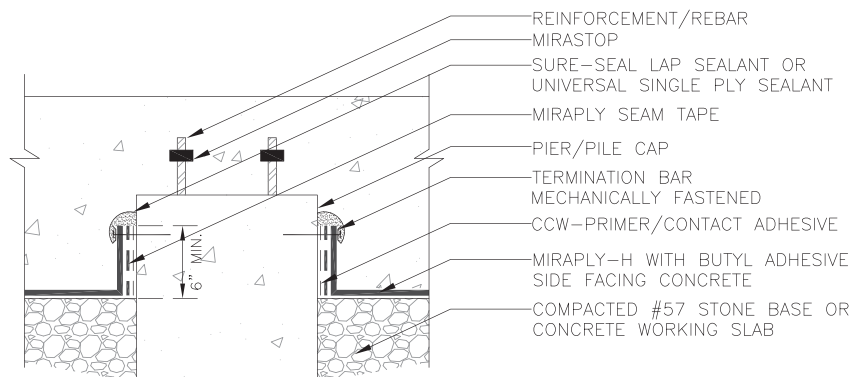
NOTES:

1. Refer to Technical Data Sheets for additional information.

MiraPLY Detail Drawings

Pile Cap

(MP-20)



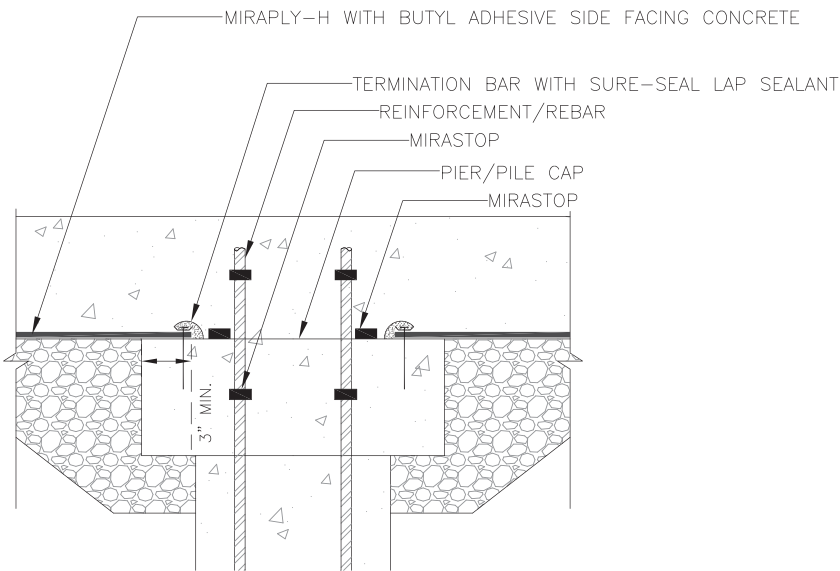
NOTES:

1. Concrete shall be smooth, sound and clean.
2. Refer to Technical Data Sheets for additional information.

MiraPLY Detail Drawings

MiraPLY-H Flush Pile Cap

(MP-21)



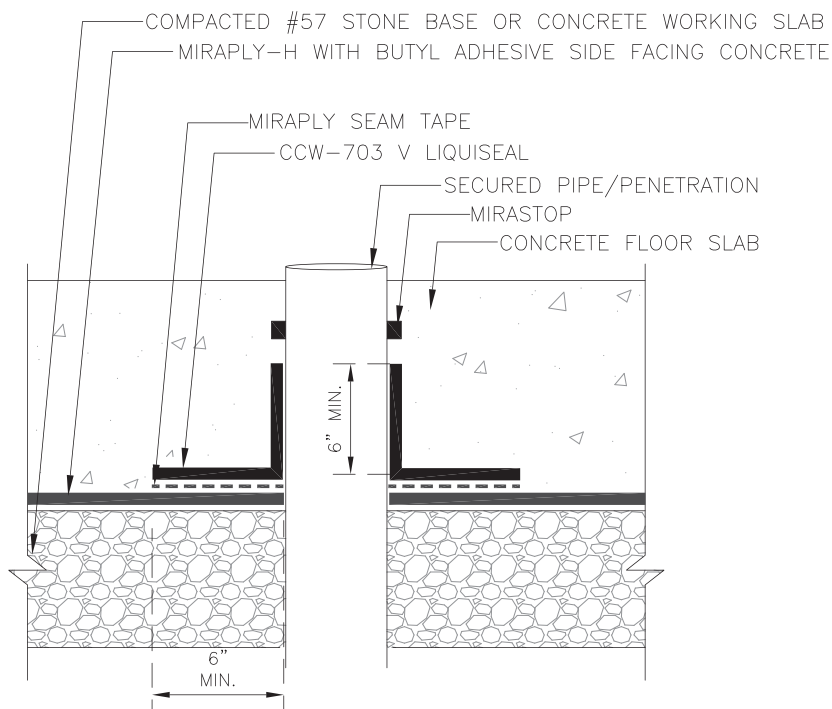
NOTES:

1. Refer to Technical Data Sheets for additional information.

MiraPLY Detail Drawings

MiraPLY-H Penetration

(MP-40)



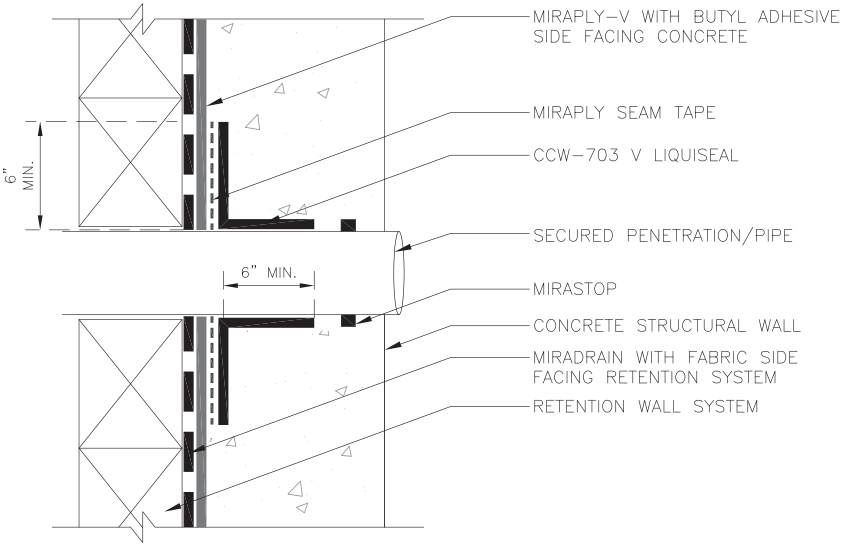
NOTES:

1. Steel pipe must be cleaned and abraded to bright finish.
2. PVC pipe must be abraded to promote adhesion.
3. Refer to Technical Data Sheets for additional information.

MiraPLY Detail Drawings

MiraPLY-V Penetration

(MP-41)



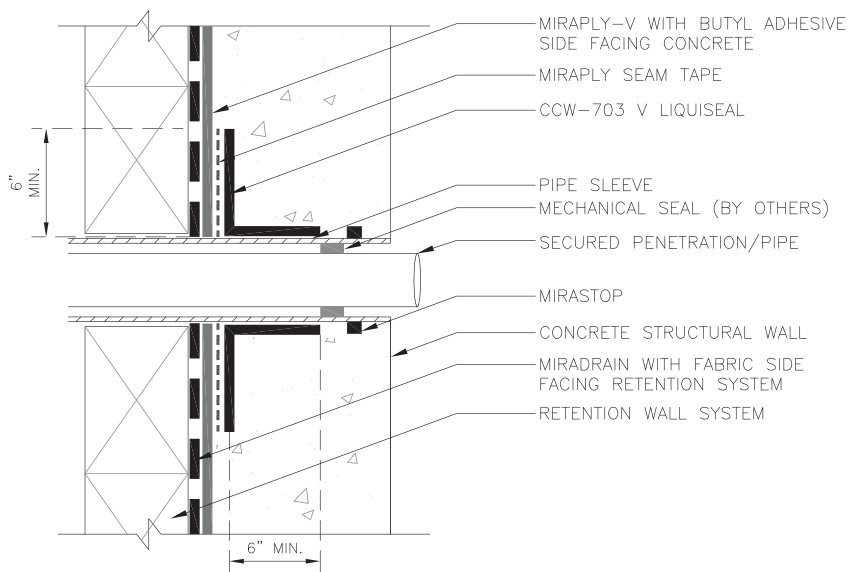
NOTES:

1. Steel pipe must be cleaned and abraded to bright finish.
2. PVC pipe must be abraded to promote adhesion.
3. Refer to Technical Data Sheets for additional information.

MiraPLY Detail Drawings

MiraPLY-V Pipe Sleeve Penetration

(MP-42)



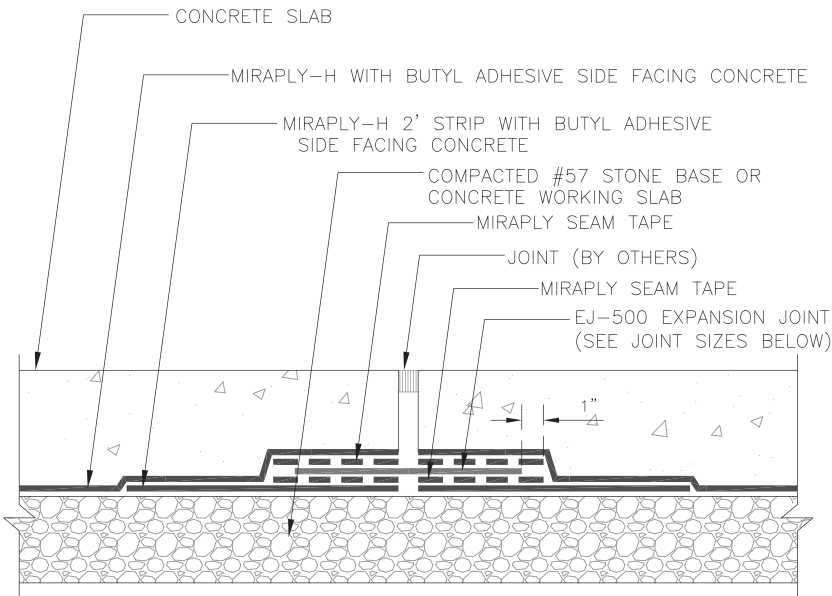
NOTES:

1. Steel pipe sleeve must be cleaned and abraded to bright finish.
2. Refer to Technical Data Sheet for additional information.

MiraPLY Detail Drawings

MiraPLY-H Slab Expansion Joint

(MP-60)



JOINTS +/- 1 3/4" USE EJ-500/40
JOINTS +/- 2" USE EJ-500/100

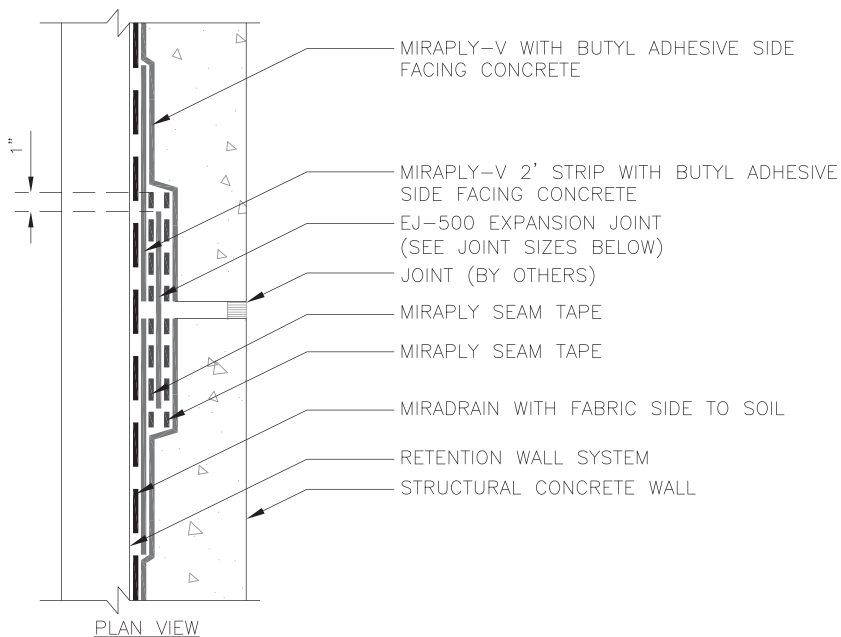
NOTES:

1. Refer to Technical Data Sheets for additional information.

MiraPLY Detail Drawings

MiraPLY-V Wall Expansion Joint

(MP-61)



JOINTS +/- $\frac{3}{4}$ " USE EJ-500/20
JOINTS +/- $1\frac{1}{4}$ " USE EJ-500/40
JOINTS +/- 2" USE EJ-500/100

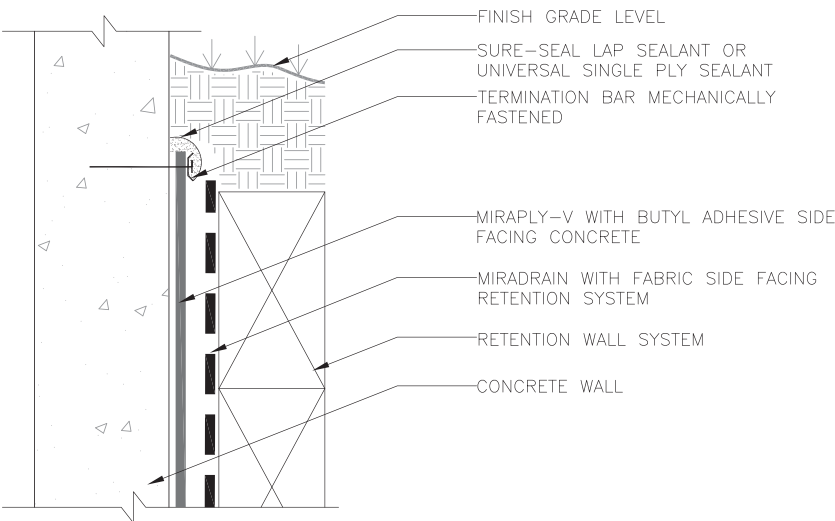
NOTES:

1. Refer to Technical Data Sheets for additional information.

MiraPLY Detail Drawings

Below Grade Termination

(MP-70)



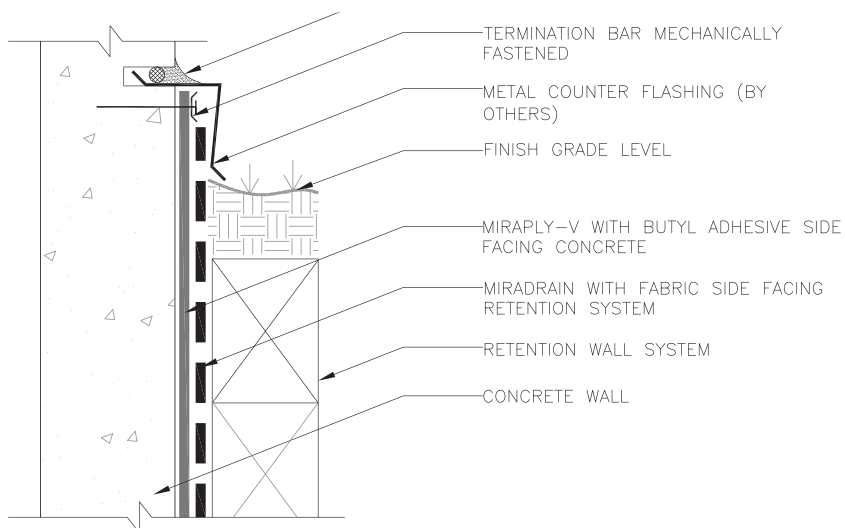
NOTES:

1. Refer to Technical Data Sheets for additional information.

MiraPLY Detail Drawings

Exposed Termination

(MP-71)



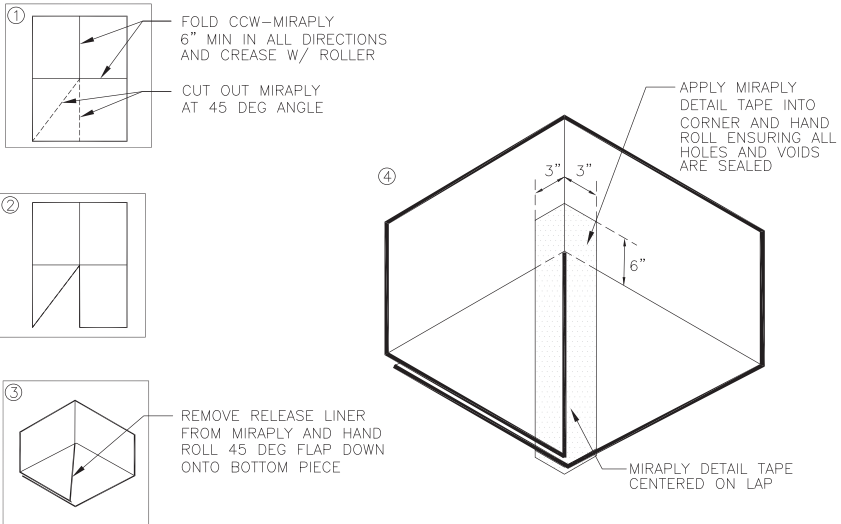
NOTES:

1. Refer to Technical Data Sheets for additional information.

MiraPLY Detail Drawings

MiraPLY Inside Corner

(MP-80)



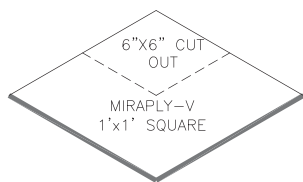
NOTES:

- 1. Refer to Technical Data Sheets for additional information.

MiraPLY Detail Drawings

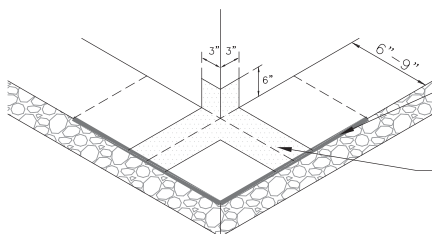
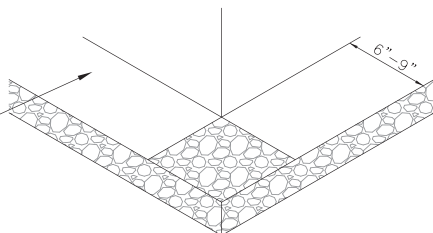
MiraPLY Outside Corner

(MP-81)



- ① CUT OUT 1'x1' SQUARE OF MIRAPLY-V AND THEN A 6'x6' SQUARE NOTCH TO CREATE A 90 DEGREE FLAT ANGLE SHEET

- ② MAKE A STRAIGHT LINE RELIEF CUT AT THE OUTSIDE CORNER OF A MIRAPLY-V SHEET WITH THE MIRAPLY-V EXTENDING ONTO THE HORIZONTAL 6"-9"



- ③ REMOVE RELEASE LINER FROM 90 DEGREE FLAT ANGLE SHEET AND INSTALL UNDER OUTSIDE CORNER RELIEF CUT AT HORIZONTAL

- ④ INSTALL MIRAPLY DETAIL TAPE TO CUT EDGES AND HAND ROLL ENSURING ALL HOLES AND VOIDS ARE SEALED

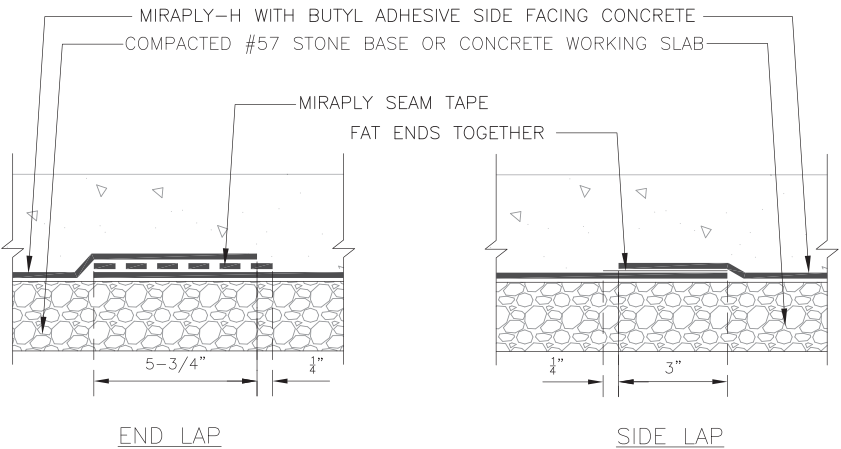
NOTES:

1. Refer to Technical Data Sheets for additional information.

MiraPLY Detail Drawings

MiraPLY-H End and Side Lap

(MP-90)

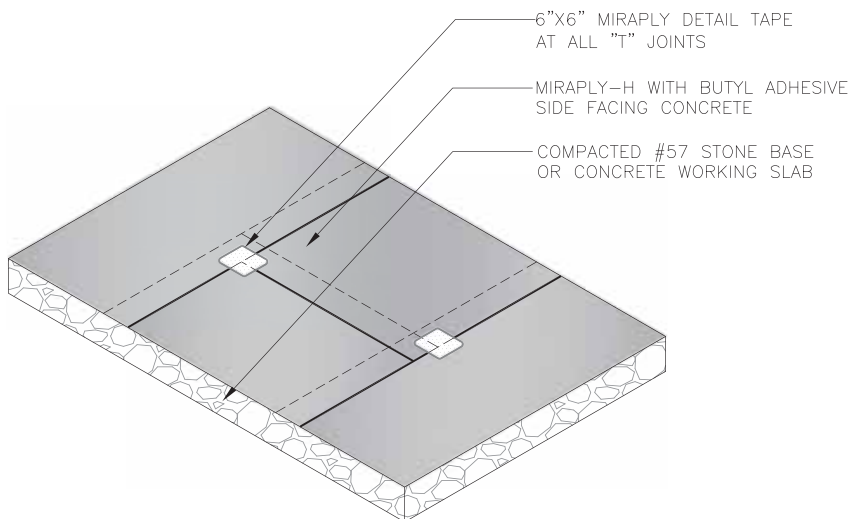


- NOTES:**
1. For Side Laps, install sheets of MiraPLY-H with a minimum 3" side overlap with 1/4" of exposed adhesive. Ensure the membrane lays flat and no openings are visible. Stagger end laps. Remove the release liners on the Miraply Seam Tape, for end lap, and Factory Applied Tape (FAT) mating the two sheets together. After the seam is fully constructed, roll the seam with a hard rubber roller.
 2. Refer to Detail Drawing MP-91 to seal "T" Joints.
 3. Refer to Technical Data Sheets for additional information.

MiraPLY Detail Drawings

MiraPLY-H "T" Joints

(MP-91)



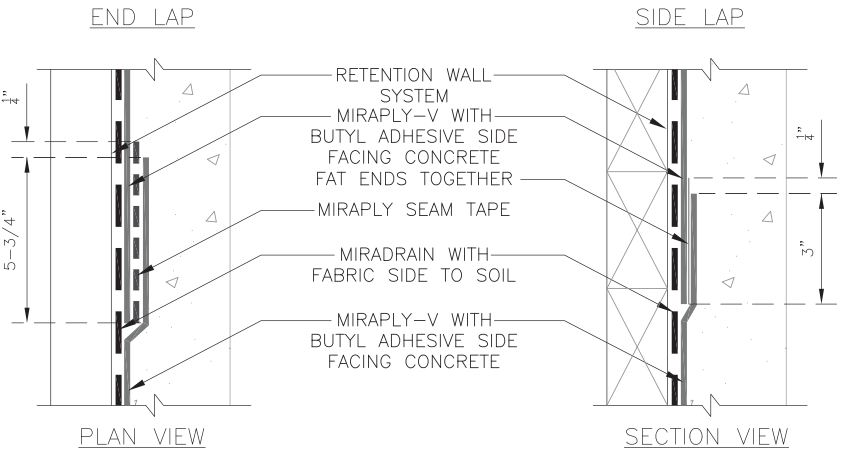
NOTES:

1. Stagger end laps a minimum of 1'.
2. Refer to Technical Data Sheets for additional information.

MiraPLY Detail Drawings

MiraPLY-V End and Side Lap

(MP-92)



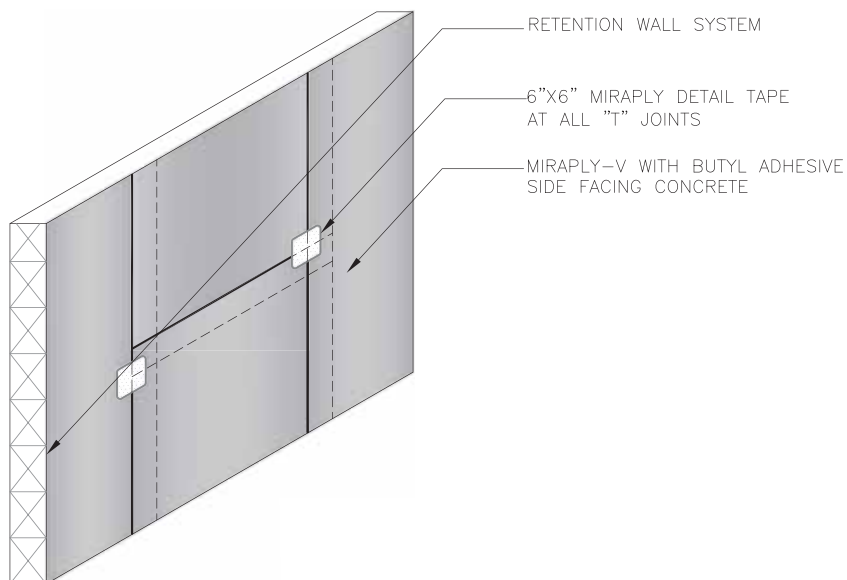
NOTES:

1. For Side Laps, install sheets of MiraPLY-V with a minimum 3" side overlap with 1/4" of exposed adhesive. Ensure the membrane lays flat and no openings are visible. Stagger end laps. Remove the release liners on the Miraply Seam Tape, for end lap, and Factory Applied Tape (FAT) mating the two sheets together. After the seam is fully constructed, roll the seam with a hard rubber roller.
2. Refer to Detail Drawing MP-93 to seal "T" Joints.
3. Refer to Technical Data Sheets for additional information.

MiraPLY Detail Drawings

MiraPLY-V "T" Joints

(MP-93)



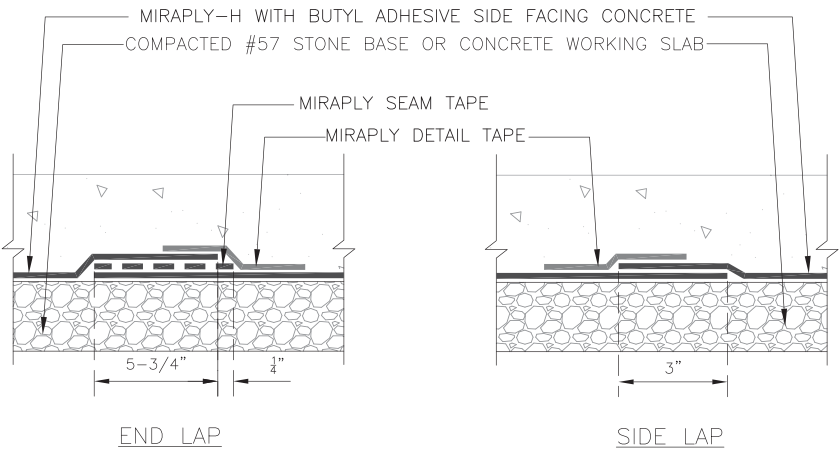
NOTES:

1. Stagger end laps a minimum of 1'.
2. Refer to Technical Data Sheets for additional information.

MiraPLY Detail Drawings

Enhanced MiraPly-H End and Side Lap

(MP-94)



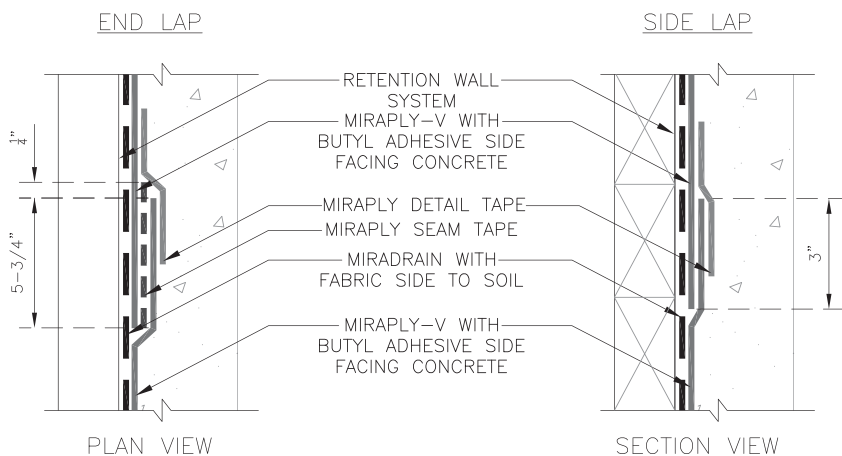
NOTES:

1. For Side Laps, install sheets of MiraPLY-H with a minimum 3" side overlap with 1/4" of exposed adhesive. Ensure the membrane lays flat and no openings are visible. Stagger end laps. Remove the release liners on the Miraply Seam Tape, for end lap, and Factory Applied Tape (FAT) mating the two sheets together. After the seam is fully constructed, roll the seam with a hard rubber roller.
2. Refer to Technical Data Sheets for additional information.

MiraPLY Detail Drawings

Enhanced MiraPLY-V End and Side Lap

(MP-95)



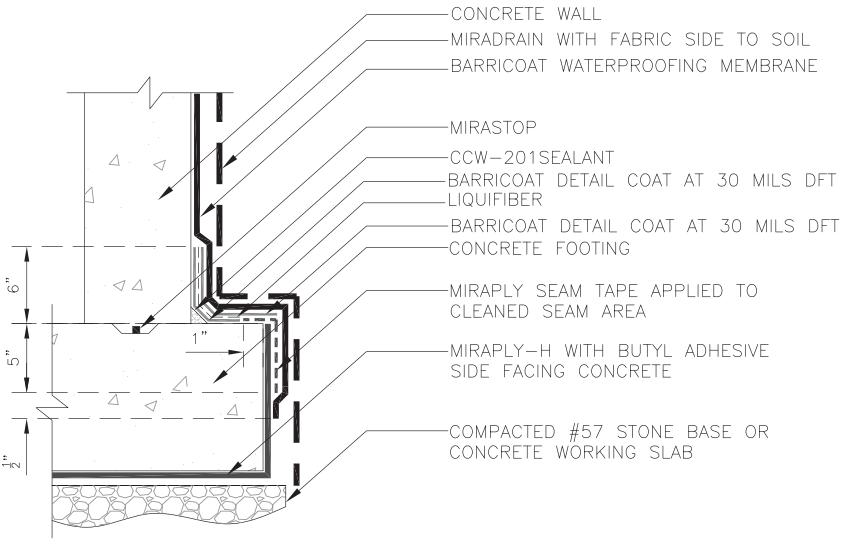
NOTES:

1. For Side Laps, install sheets of MiraPLY-V with a minimum 3" side overlap with $1/4"$ of exposed adhesive. Ensure the membrane lays flat and no openings are visible. Stagger end laps. Remove the release liners on the Miraply Seam Tape, for end lap, and Factory Applied Tape (FAT) mating the two sheets together. After the seam is fully constructed, roll the seam with a hard rubber roller.
2. For shotcrete application, the shotcrete company must be a licensed company and the nozzleman must be ACI Certified.
3. Refer to Technical Data Sheets for additional information.

MiraPLY Detail Drawings

MiraPLY-H to Barricoat at Footing Tie-In

(MP-100)



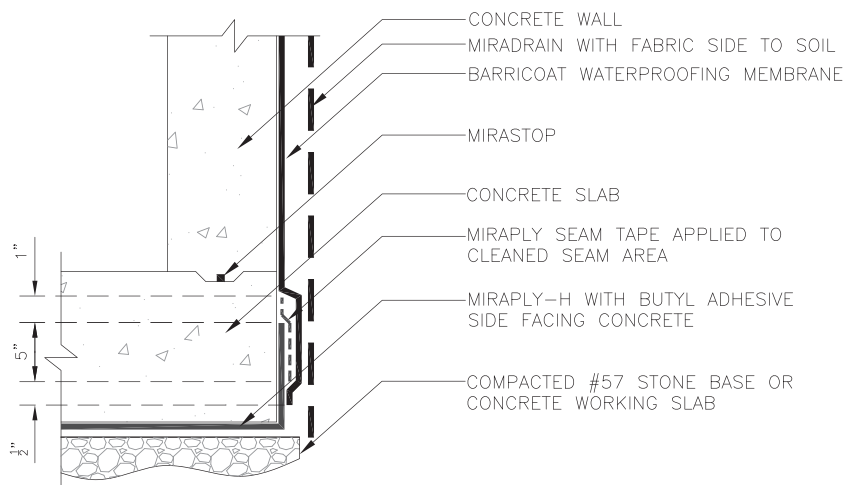
NOTES:

1. Extend BarriCOAT a minimum of $\frac{1}{2}$ " beyond MiraPLY Seam Tape.
2. CCW-MiraDRAIN HC or CCW approved perimeter drain not shown for clarity.
3. Refer to Technical Data Sheets for additional information.

MiraPLY Detail Drawings

MiraPLY H to Barricoat at Slab Tie-In

(MP-101)



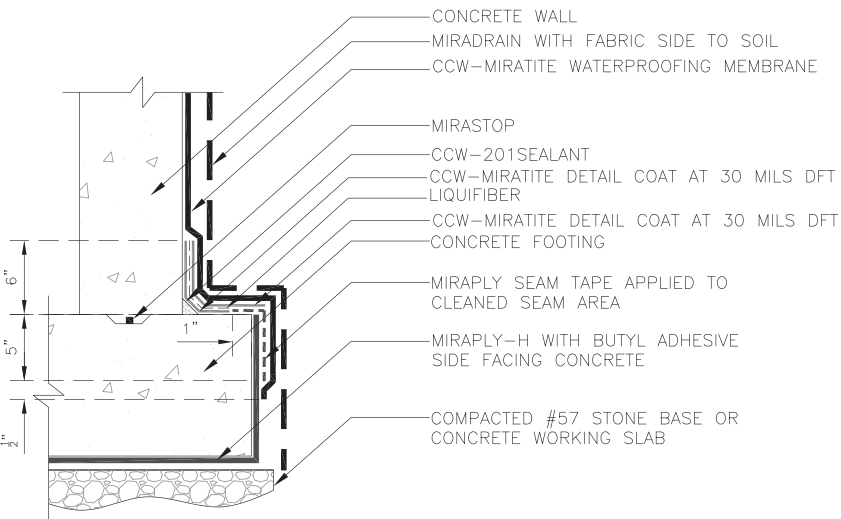
NOTES:

1. Extend BarriCOAT a minimum of $\frac{1}{2}$ " beyond MiraPLY Seam Tape.
2. CCW-MiraDRAIN HC or CCW approved perimeter drain not shown for clarity.
3. Refer to Technical Data Sheets for additional information.

MiraPLY Detail Drawings

MiraPLY-H to CCW-MiraTITE at Footing Tie-In

(MP-102)



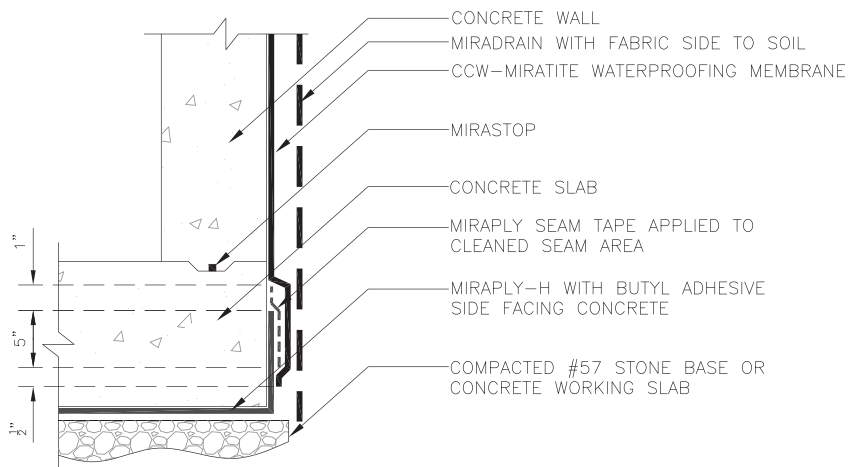
NOTES:

- 1. Extend CCW-MiraTITE a minimum of 1/2" beyond MiraPLY Seam Tape.
- 2. CCW-MiraDRAIN HC or CCW approved perimeter drain not shown for clarity.
- 3. Refer to Technical Data Sheets for additional information.

MiraPLY Detail Drawings

MiraPLY-H to CCW-MiraTITE at Slab Tie-In

(MP-103)



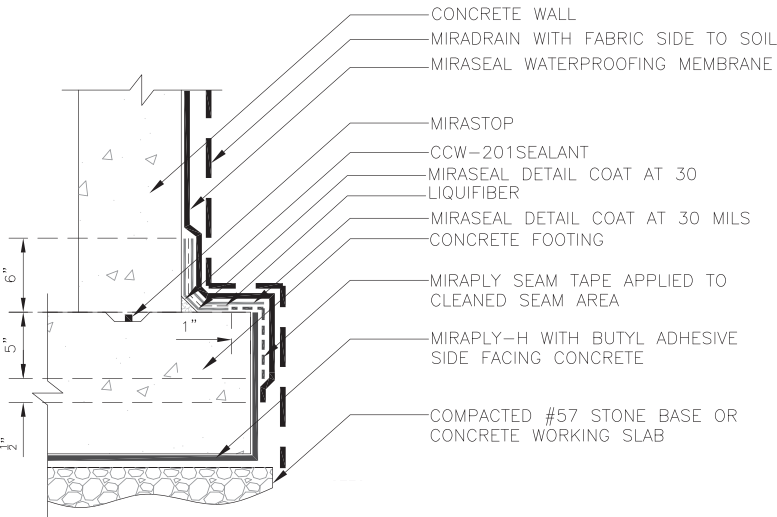
NOTES:

1. Extend MiraTITE a minimum of $\frac{1}{2}$ " beyond MiraPLY Seam Tape.
2. Refer to Technical Data Sheets for additional information.

MiraPLY Detail Drawings

MiraPLY-H to MiraSEAL at Footing Tie-In

(MP-104)



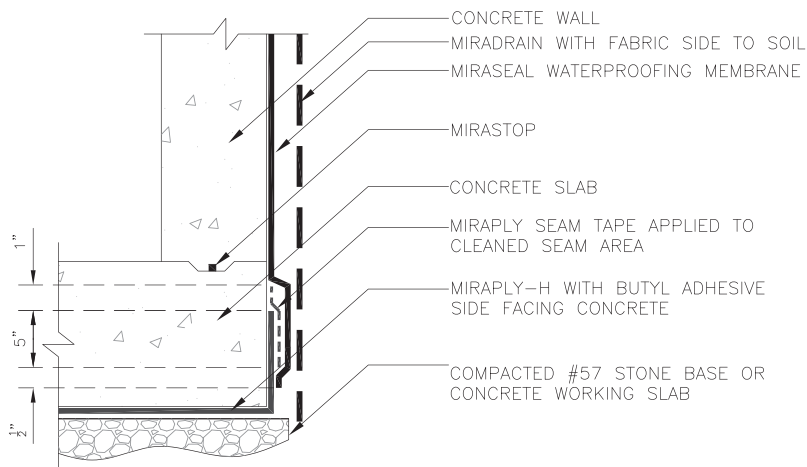
NOTES:

1. Extend MiraSEAL a minimum of $\frac{1}{2}$ " beyond MiraPLY Seam Tape.
2. CCW-MiraDRAIN HC or CCW approved perimeter drain not shown for clarity.
3. Refer to Technical Data Sheets for additional information.

MiraPLY Detail Drawings

MiraPLY-H to MiraSEAL at Slab Tie-In

(MP-105)



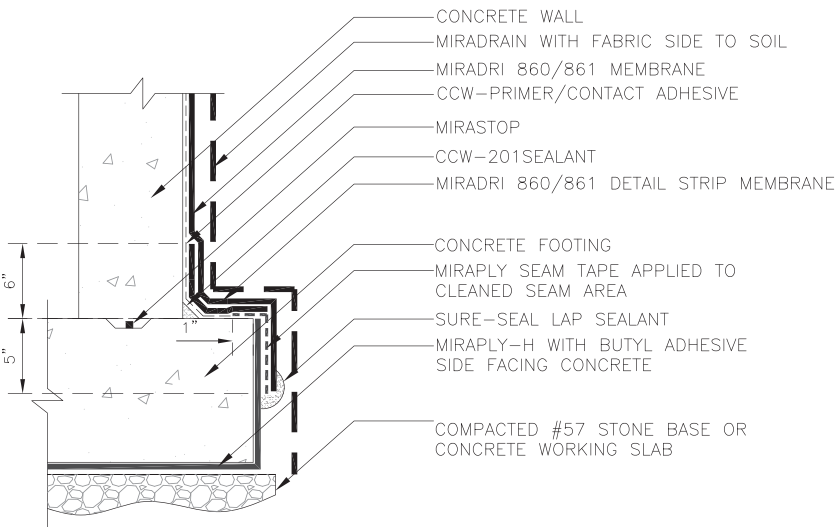
NOTES:

1. Extend MiraSEAL a minimum of $\frac{1}{2}$ " beyond MiraPLY Seam Tape.
2. Refer to Technical Data Sheets for additional information.

MiraPLY Detail Drawings

MiraPLY-H to MiraDRI 860 at Footing Tie-In

(MP-106)



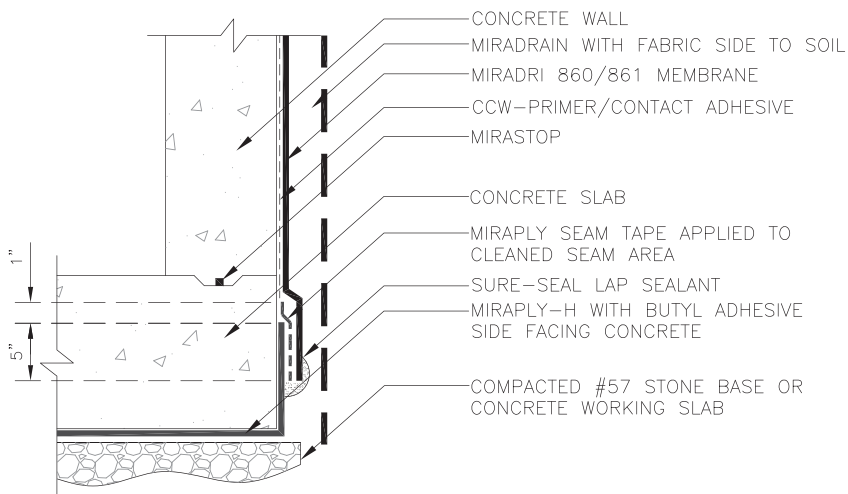
NOTES:

1. CCW-MiraDRAIN HC or CCW approved perimeter drain not shown for clarity.
2. Refer to Technical Data Sheets for additional information.

MiraPLY Detail Drawings

MiraPLY-H to MiraDRI 860 Tie-In

(MP-107)



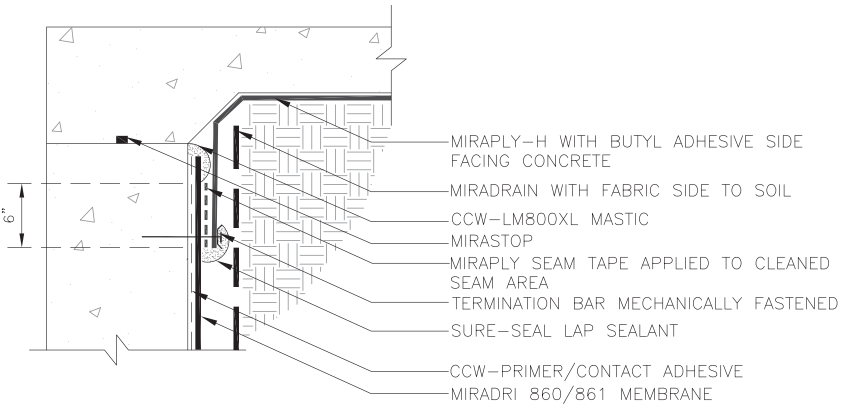
NOTES:

1. Refer to Technical Data Sheets for additional information.

MiraPLY Detail Drawings

MiraPLY-H to MiraDRI 860 Lower Wall Tie-In

(MP-108)



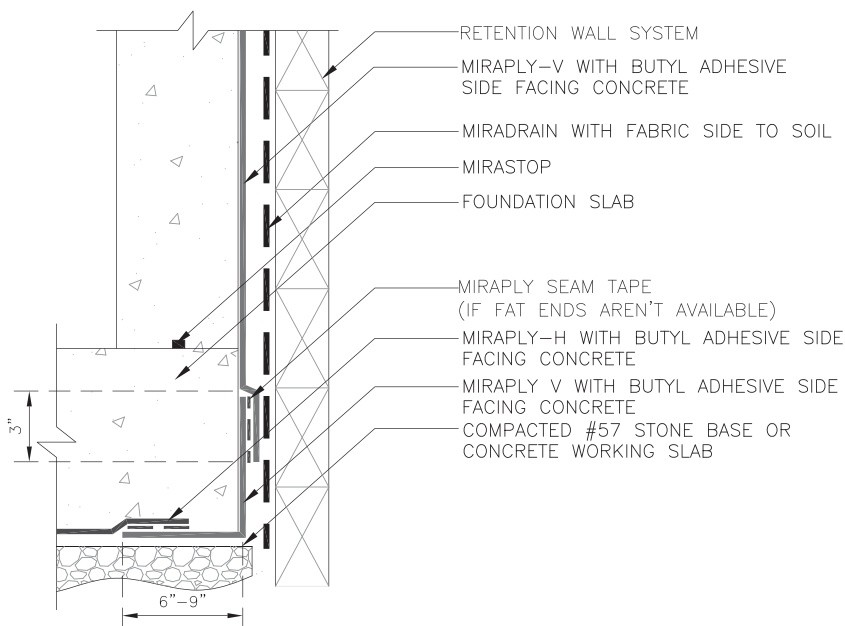
NOTES:

1. Refer to Technical Data Sheets for additional information.

MiraPLY Detail Drawings

MiraPLY-H to MiraPLY-V Foundation Tie In

(MP-109)



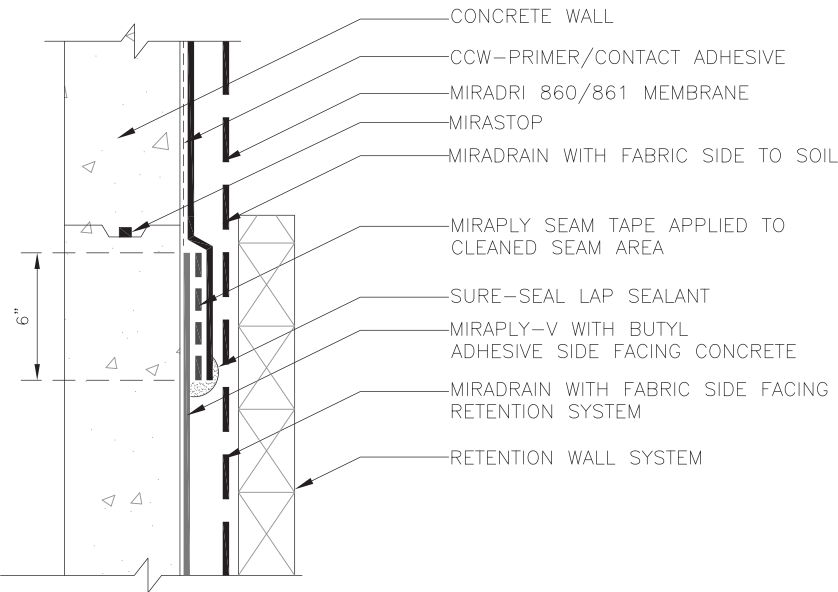
NOTES:

1. Install sheets of MiraPLY-V with a minimum 3" side overlap with $\frac{1}{4}$ " of exposed adhesive. Ensure the membrane lays flat and no openings are visible. Stagger end laps. Remove the release liners on the Miraply Seam Tape, for end lap, and Factory Applied Tape (FAT) mating the two sheets together. After the seam is fully constructed, roll the seam with a hard rubber roller.
2. Refer to most current details on www.carlisleccw.com.

MiraPLY Detail Drawings

MiraPLY-V to MiraDRI 860 at Vertical Wall

(MP-110)



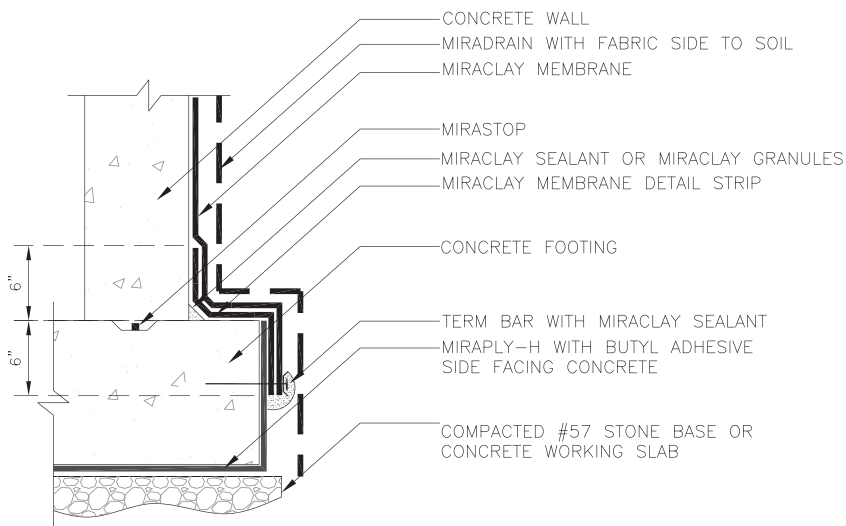
NOTES:

1. Refer to Technical Data Sheets for additional information.

MiraPLY Detail Drawings

MiraPLY-H to MiraCLAY at Footing Tie-In

(MP-111)



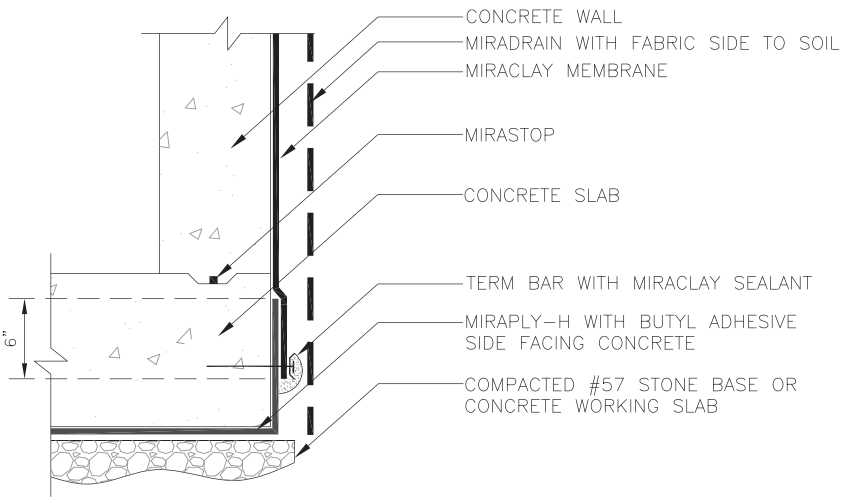
NOTES:

1. CCW—MiraDRAIN HC or CCW approved perimeter drain not shown for clarity.
2. Refer to Technical Data Sheets for additional information.

MiraPLY Detail Drawings

MiraPLY-H to MiraCLAY at Slab Tie-In

(MP-112)



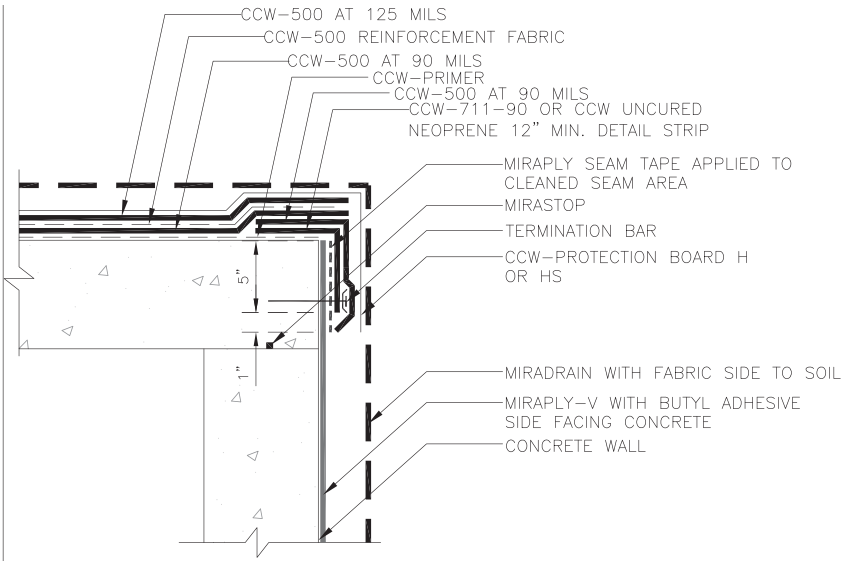
NOTES:

- 1. Refer to Technical Data Sheets for additional information.

MiraPLY Detail Drawings

MiraPLY-V to CCW-500R System Tie-In

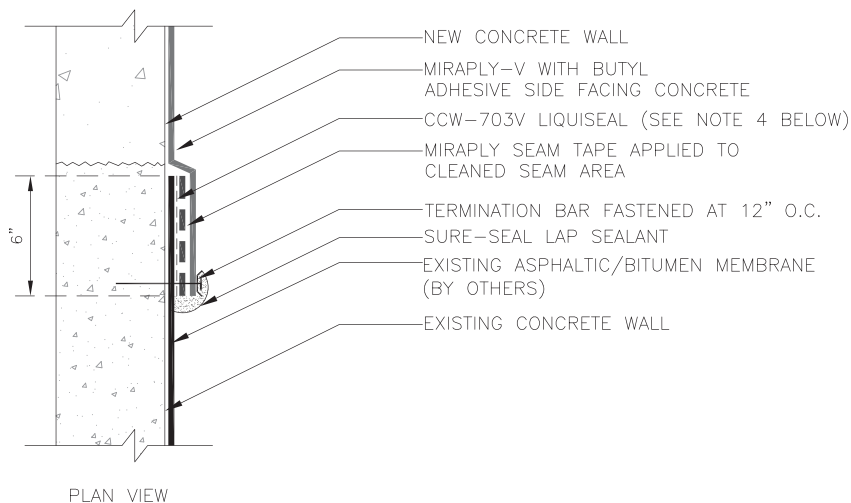
(MP-113)



MiraPLY Detail Drawings

MiraPLY-V to Others Membrane

(MP-114)



NOTES:

1. Refer to Technical Data Sheets for additional information.
2. Retention wall system at new concrete wall not shown for clarity.
3. Miradrain/protection course not shown for clarity. Add in as required to complete the system.
4. Add CCW-703V Liqueal 6" strip over existing membrane and under the shown MiraPLY Seam Tape when the existing membrane type is unknown. Allow the CCW-703V Liqueal to cure a minimum of 12 hrs prior to applying the MiraPLY Seam Tape.

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MiradRAIN Product Guide

Drainage Composite

Product Name	Description	Flow Rate	Core	Fabric	Fabric Description	Fabric Apparent Opening Size*	Fabric Water Flow Rate	Thickness	Compressive Strength
MiradRAIN 2000	Intermediate-flow, low compressive-strength, shallow depths not exceeding 10 feet	18 gpm/ft	Polypropylene	DCN04	nonwoven filter fabric	40 Sieve	110 gpm/ft ²	0.40"	11,000 psi
MiradRAIN 2000DT	Intermediate-flow, low compressive-strength, shallow depths not exceeding 10 feet; DOT Projects	18 gpm/ft	Polypropylene	160N	nonwoven filter fabric meeting AASHTO M288-06	40 Sieve	110 gpm/ft ²	0.40"	11,000 psi
MiradRAIN 6000	high-flow, high-compressive strength	21 gpm/ft	Polypropylene	DCN04	nonwoven filter fabric	40 Sieve	110 gpm/ft ²	0.40"	15,000 psi
MiradRAIN 6000DT	high-flow, high-compressive strength, DOT Projects	21 gpm/ft	Polypropylene	160N	nonwoven filter fabric meeting AASHTO M288-06	70 Sieve	110 gpm/ft ²	0.40"	16,500 psi
MiradRAIN 6000XL	high-flow, high-compressive strength, can be installed horizontally in planters	21 gpm/ft	Polypropylene	160N	nonwoven filter fabric meeting AASHTO M288-06	70 Sieve	110 gpm/ft ²	0.40"	16,500 psi
MiradRAIN 6200	high-flow, high-compressive strength, Polymeric Sheet - prevents die-cutting of waterproofing membrane	21 gpm/ft	Polypropylene	DCN04	nonwoven filter fabric	40 Sieve	110 gpm/ft ²	0.40"	15,000 psi

MiraDRAIN Product Guide

Drainage Composite

Product Name	Description	Flow Rate	Core	Fabric	Fabric Description	Fabric Apparent Opening Size*	Fabric Water Flow Rate	Thickness	Compressive Strength
MiraDRAIN 6200XL	high-flow, high-compressive strength, can be installed horizontally in planters, Polymeric Sheet - prevents die-cutting of waterproofing membrane	21 gpm/ft.	Polypropylene	160N	nonwoven filter fabric meeting AASHTO M288-06	70 Sieve	110 gpm/ft ²	0.40"	16,500 psi
MiraDRAIN 8000-P	high-performance, chemical resistant	23 gpm/ft.	Polypropylene	FW402	monofilament woven filter fabric	40 Sieve	145 gpm/ft ²	0.40"	21,000 psi
MiraDRAIN 9000	high-performance, high-strength	23 gpm/ft.	Polypropylene	FW402	monofilament woven filter fabric	40 Sieve	145 gpm/ft ²	0.40"	21,000 psi
MiraDRAIN 9800	high-performance, high-strength	23 gpm/ft.	Polypropylene	180N	heavy-weight, nonwoven filter fabric	80 Sieve	95 gpm/ft ²	0.40"	21,000 psi
MiraDRAIN 9900	high-performance, very high-compressive strength	24 gpm/ft.	Polypropylene	FW402	monofilament woven filter fabric	40 Sieve	365 gpm/ft ²	0.40"	33,000 psi
MiraDRAIN HC	high-flow, foundation or edge drain	30 gpm/ft.	Polypropylene	DCN04	nonwoven filter fabric	40 Sieve	110 gpm/ft ²	1"	9,500 psi
MiraDRAIN GR9400	horizontal green roof applications with moisture retention mat fabric	21 gpm/ft.	Polypropylene	GR300	moisture retention filter medium	100 Sieve	75 gpm/ft ²	1"	9,500 psi

*AOS (Apparent Opening Size) - A higher Percent Opening Area will be less susceptible to long-term clogging.

MiraDRAIN Application Guide

CCW MiraDRAIN prefabricated drainage panels may be installed in a variety of construction applications including: retaining walls, foundation walls (both waterproofed and non-waterproofed), lagging systems, split slabs, plaza decks, planters, buttress/landfills, interceptor/edge drains and greenroofs. The following section is provided for use of MiraDRAIN with the MiraPLY System. Contact your local MiraDRAIN representative for specific guidelines.

FOUNDATION WALLS - VERTICAL APPLICATIONS

MiraDRAIN panels can be installed in rows or columns with the fabric side toward the soil. Each method has its advantages depending on the criteria of the project.

Installing MiraDRAIN in Columns

1. Start at the low point of the wall and attach the panel to the wall with approved CCW adhesive.
2. Attach adjacent panels together by:



A Overlapping the core flanges.



B Mate fabric flaps together and fold over adjacent panel. Adhere fabric with approved CCW adhesive.

MiraDRAIN Application Guide

Installing MiraDRAIN in Rows (Horizontally)

1. Place the longitudinal edge of the core against the wall, flush with the wall footing, or place the longitudinal edge of the core on the footing and turn up the wall (as shown on cover).
2. Attach subsequent panels in shingle fashion as follows:



A

Attach the longitudinal edge of MiraDRAIN to longitudinal edge of either MiraDRAIN or CCW MiraDRAIN HC™.



B

Overlap the geotextile fabric flaps from both panels folded in a shingle fashion over the adjacent panel. Adhere fabric with approved CCW adhesive.

MiraDRAIN Application Guide

DRAINAGE COLLECTOR - DISCHARGE SYSTEM

Collector Pipe

1. Place CCW MiraDRAIN HC or collector pipe as required in project design details. CCW MiraDRAIN HC should be installed adjacent to MiraDRAIN. Care must be taken to ensure a continuous drainage path between CCW MiraDRAIN HC and MiraDRAIN panels. MiraDRAIN Connectors are designed to connect to a normal 4" drainage pipe.
2. For installations where a collector pipe is specified, encapsulate the collector pipe in a gravel bed with a supplemental section of filter fabric as a separator/filter.

DRAIN CONNECTORS, APPROVED CCW ADHESIVES & ACCESSORIES



6" & 12" HC Endout Connectors



6" & 12" HC Sideout Connectors

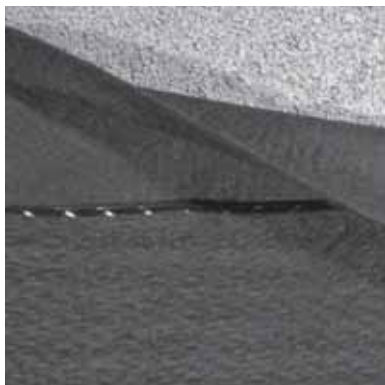
MiraDRAIN Application Guide

When installing end-of-roll seams:



Cut approximately 3" (75 mm) of core leaving the geotextile fabric to overlap the adjacent panel. The fabric can be adhered with approved CCW adhesive. (Optional: Cover butted core with additional geotextile fabric.)

Termination drainage panel:



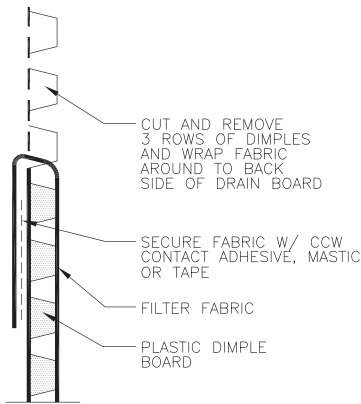
The top or terminal edge of CCW MiraDRAIN should be sealed by applying a piece of filter fabric sufficient to prevent soil or other foreign construction materials from intruding into or behind CCW MiraDRAIN panels, an alternative would be to cut the core from the fabric by a depth of 3 dimples to provide excess fabric for wrapping behind the core.

MiraDRAIN Drainage Composite System Detail

Panel Termination

(MD-8)

PANEL TERMINATION DETAIL

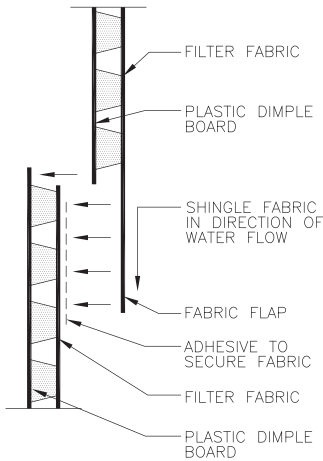


MiraDRAIN Drainage Composite System Detail

Wall Panel Connection

(MS-9A)

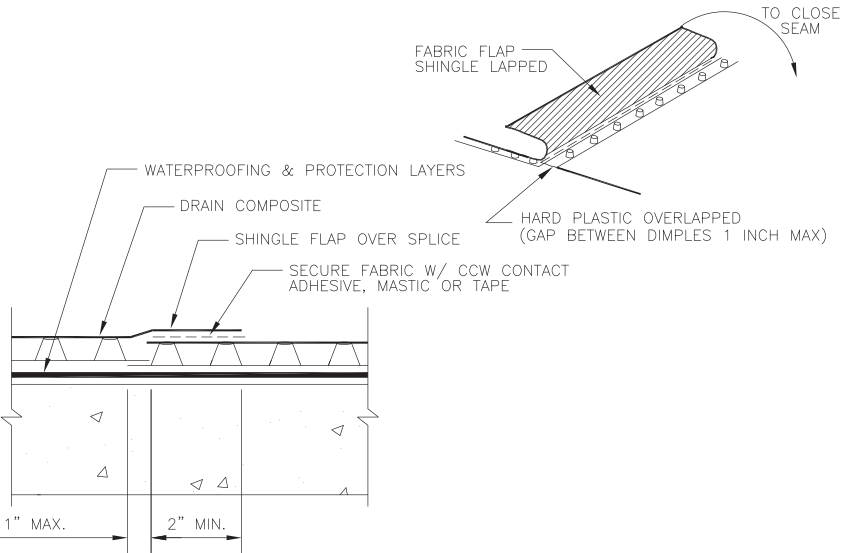
PANEL CONNECTION DETAIL



MiraDRAIN HC Accessory Detail

MiraDRAIN Splice

(MS-10A)



NOTES:

1. SET DOWN STREAM DRAIN COMPOSITE.
2. SET UPPER DRAIN COMPOSITE WITH HARD PLASTIC PLACED ONTO LOWER COMPOSITE.
3. EXTEND FLAP OF UPSTREAM COMPOSITE OVER LOWER COMPOSITE.
4. GLUE OR TAPE FLAPS INTO POSITION UNTIL OVERBURDEN IS INSTALLED COMPLETELY.

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Technical Bulletins

CCW PRODUCT LINE SHELF LIFE

The following is a list of the minimum shelf lives for the Carlisle Coatings & Waterproofing product line. Shelf lives are based on the date of manufacture and are referenced on batch codes found on labels placed on the products. Since many batch codes are structured differently, please contact either CCW Customer Service or Technical Service for specific batch code interpretation.

All products must be stored in accordance with CCW requirements, as improper handling and storage will adversely affect product quality and workability.

6 Months

- CCW MiraSEAL

9 Months

- CCW Barriseal®-S
- CCW Barricoat®-S

1 Year (12 Months)

Waterproofing Membranes:

- CCW Barricoat-R
- CCW MiraDRI® 860/861
- CCW 525-V
- CCW 525-H
- CCW-703-V Liquiseal
- CCW-703-H Liquiseal
- CCW MiraPLY-H
- CCW MiraPLY-V

Air & Vapor Barriers:

- CCW Barriseal-R
- CCW-705 FR-A
- CCW-705
- CCW-705 VP
- CCW-705 Strips
- CCW-705 TWF
- CCW Barritech VP
- CCW Barritech NP™
- CCW Barricure™

CCW Contact Adhesives:

- CCW-702 WB Primer
- CCW-702 Primer
- CCW-702 LV Primer
- CCW-715 Primer
- CCW AWP Primer
- CCW CAV-GRIP

CCW Accessories

- CCW-704 Mastic
- CCW Liquideck
- Sure-Seal Lap Sealant
- SecurTAPE™
- BarriBond Sealant
- CCW Detail Tape
- Single Ply Universal Sealant
- CCW LM-800XL
- CCW GreenBond WB

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2 Years (24 Months)

- CCW-500
- CCW MiraDRAIN
- CCW MiraSTOP
- CCW-201
- CCW-550 Primer
- CCW MiraCLAY Sealant

Indefinite (with proper storage)

- CCW Liquifiber™
- Pre-Kleened EPDM
- CCW MiraCLAY
- CCW MiraCLAY Granules
- CCW Root Barrier
- Protection Board V
- Protection Board H/HS
- R2+Polyiso Insulation
- CCW 200V Protection Fabric
- CCW 300HV Protection Fabric
- CCW-500 Reinforcing Fabric
- Sure-Seal EPDM

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MIRAPLY WATERPROOFING – “BEST PRACTICES” AND JOBSITE REQUIREMENTS

This Technical Bulletin is provided to support the installation of the CCW MiraPLY Blindside Waterproofing System. The sequencing and coordination with the General Contractor, Waterproofing Contractor and relevant Trades is critical for the success of a blindside waterproofingsystem.

Quality Assurance: Field inspections are recommended to confirm proper installation and detailing for the MiraPLY System and at critical stages of relevant work by other Trades. These “Hold Points” should be clearly understood and coordinated with the party responsible for inspections, the General Contractor, the Waterproofing Contractor and the relevant Trades. CCW recommends that the 1st Hold Point for each specific condition or sequence (aka “First Point of Verification”) is allotted ample time to review and make any necessary corrections for any unforeseen challenges.

Repairs: Ample time regardless of which Hold Point or inspection stage should be provided for responsible party to make corrections for any non conformances. Repair procedures to the MiraPLY System are as follows:

- **For small damaged areas:** Clean the MiraPLY membrane with a cloth dampened with Weathered Membrane Cleaner and allow to dry. Repair slices, cuts and small punctures (½" or less) with MiraPLY Detail Tape. Center the MiraPLY Detail Tape over damaged area and roll tape with hard rubber roller using firm hand pressure.
- **For larger damaged areas:** Repair larger areas with a new piece of MiraPLY membrane (i.e. patch) extending beyond damaged area by approximately 6" in all directions. Clean the existing MiraPLY membrane beyond the patch with a cloth dampened with Weathered Membrane Cleaner and allow to dry.
 - Option-1: Apply MiraPLY Seam Tape to the underside of the patch. Remove release liner of MiraPLY Seam Tape; then position patch over damaged area and roll patch with a hard rubber roller using firm hand pressure.
 - Option-2: Position patch over damaged area; then apply MiraPLY Detail Tape around all edges of patch and roll tape with hard rubber roller using firm hand pressure.

Site Preparation: Proper preparation not only allows an opportunity to optimize installation time but more importantly, allows an opportunity to maximize workmanship quality. Support of excavation, site dewatering, substrate prep and anticipated future tie-ins all have a significant impact on the overall quality of a blindside waterproofing system.

- **Support of Excavation:** Various types of shoring systems are acceptable for the MiraPLY System provided they provide a relatively even and regular surface. The whalers, rakers, struts, bracing and soil anchors (i.e. tiebacks) often used with shoring systems can all be easily addressed with the MiraPLY System provided that work is properly sequenced and coordinated with relevant Trades.
- **Site Dewatering:** Water, ice, snow, etc. may compromise the installation and detailing of blindside waterproofing system and therefore, adequate site dewatering is required and must remain in-place at minimum until after concrete placement. When site dewatering asdesigned is not adequate, the use of additional or temporary dewatering may be required and also remain in-place at

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minimum until after concrete placement. Any dewatering plan should be reviewed and approved by the Engineer of Record or similar.

- **Horizontal Surface Prep:** MiraPLY may be installed directly against a concrete mud slab or a gravel/earth subbase. The concrete mudslab should be relatively smooth and regular without any sharp protrusions or significant unconsolidated concrete. When installing MiraPLY System without MiraDRAIN® or rigid insulation, the concrete mudslab should be screeded, floated, troweled, etc. to provide an ICRI1 Concrete Surface Profile of PC1 - PC6 and the gravel/earth subbase must be ¾" or smaller aggregate, level and compacted to a minimum of 85% Proctor density. Sand, pea gravel, etc. that may be displaced after compaction requires additional surface prep that may include MiraDRAIN, rigid insulation or similar. MiraDRAIN may be installed over a concrete mudslab or gravel/earth subbase as part of the overall as-designed drainage system. The concrete mudslab should be screeded, floated, troweled, etc. to provide an ICRI1 Concrete Surface Profile of PC1 - PC8 and the gravel/earth subbase must be ¾" or smaller aggregate, level and compacted.
- **Crane Pads, Elevator Pits, Block-Outs, etc.:** Areas where the MiraPLY System is installed in advance of or after normal installation sequencing and production typically requires additional attention in preparation, coordination and protection. CCW recommends that any MiraPLY membrane not intended to receive concrete placement within 60 days is protected from both physical damage and ultraviolet exposure to allow for proper tie-in.
- **Vertical Surface Prep:** MiraPLY may be installed directly against most shoring systems or concrete formwork (see below). Shoring systems such as secant piles, diaphragm walls or sheet piles may require additional surface preparation of a leveling material or facing material. When installing MiraPLY System without MiraDRAIN or rigid insulation, the vertical surface should be relatively smooth and regular without any sharp protrusions or gaps/voids larger than 1". MiraDRAIN may be installed directly onto shoring systems with gaps/voids up to 2".

Membrane Installation: As with any blindside waterproofing system, the installation and detailing of the MiraPLY System is pre-applied and therefore, subject to traffic and subsequent work by other Trades. The MiraPLY System shall be protected from this adjacent and relevant work to prevent damage. Once substrate prep is complete, the installation area should be limited to the Waterproofing Contractor or any pertinent work by other Trades necessary to complete the MiraPLY installation. Upon completion of the MiraPLY System in a given installation area, no other Trade should have access to this area until the party responsible for inspection has "released" the area. Any unavoidable high-traffic areas where other Trades and construction personnel are required to walk on or above the MiraPLY System, the MiraPLY in those areas should have temporary protection to prevent physical damage and contamination.

Steel Reinforcement Bar (Rebar): Various types of rebar supports are compatible with the MiraPLY System. The MiraPLY System should be protected from physical damage during the installation of the steel reinforcement bar.

- **Reinforcing Bar Supports:** Common acceptable rebar supports are concrete bar supports (e.g. pavers, dobies, etc.), fiber-reinforced bar supports and all-plastic bar supports provided the support's base is flat and smooth. Wire bar supports

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(e.g. bolsters, chairs, etc.) even if plastic coated or epoxy coated are generally not compatible with a blindside waterproofing system. When feasible, the spacing or location of rebar supports should be positioned such that they are not directly on a MiraPLY seam or other waterproofing detail area. A general rule of thumb is to keep all rebar supports 6" away from any seams or detailed areas.

- **Reinforcing Bar Placement:** The delivery, handling and placement of rebar should be done in a manner so as not to cause any physical damage to the MiraPLY System. The rebar should not be stockpiled or temporarily stored on the MiraPLY System without proper protection, coordination and approval from the Waterproofing Contractor. Paint should not be applied to the MiraPLY System; use lumber crayon, keel or Sharpie® marker for markings, layouts, etc.
- **Reinforcing Bar Anchoring:** Penetrations thru a blindside waterproofing system to assist with the installation and securing of the rebar should be limited. The use of anchors or mechanical fasteners should be coordinated with and accepted by the Waterproofing Contractor whether penetrating the MiraPLY post membrane installation or installed prior to membrane installation.

Mechanical, Electrical & Plumbing: The delivery, handling and placement of utility work should be done in a manner so as not to cause any physical damage to the MiraPLY System. Any pipe, sleeve, conduit, etc. that the MiraPLY System needs to tie-in to shall have a smooth surface (i.e. outer wall), be properly secured and stable prior to the MiraPLY installation and detailing, and be free of any fittings, connections, bracing, anchoring, etc. for minimum 9" off the face of the MiraPLY membrane. Duct banks, penetration clusters, etc. shall require review and approval for each project specific condition to determine proper waterproofing detailing. The utility work should be properly sequenced and coordinated with the Waterproofing Contractor.

Concrete Forms: A conventional two-sided form is not acceptable for use with the MiraPLY System. Formwork for wall construction should be of the one sided type thus limiting penetrations through the blindside waterproofing. Headers, edge forms, pour stops, bulkheads, etc. should be externally braced to prevent penetrations through the MiraPLY in the adjacent areas. For edge of slab, footings, top of wall, etc. where the backside of MiraPLY will be exposed for tie-in to postapplied waterproofing, the formwork should remain in-place a minimum of 3 days after concrete placement and/or until a minimum of 3,000 psi concrete compressive strength is achieved. "Earth forms" and leave-in-place forms (e.g. stay-form) are not acceptable for use with the MiraPLY System without prior approval by CCW.

Concrete Placement: The concrete should be placed as per ACI² guidelines to provide properly consolidated concrete. CCW recommends that any internal vibrating equipment uses a rubber coated vibrator head to protect the blindside waterproofing from damage. Adjacent areas of the MiraPLY System outside of any given concrete pour, should be protected from concrete oversplash. For shotcrete applications, shotcrete should be placed as per ACI guidelines by an ACIcertified Shotcrete Nozzleman.

Special Conditions: Additional attention in preparation, coordination and protection for conditions outside of normal waterproofing installation is often required on most projects. The Pre-Installation Conference dedicated to waterproofing is often a good start for this preparation and planning, but often times there are unforeseen challenges that may arise on a given project.

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- **Transition or Termination at Grade:** If the shoring system will be exposed and removed near top of grade, the MiraPLY System should be protected in advance from excavation, burning/cutting operations, etc. Install a fire resistant protection board/sheathing between the waterproofing system including the drainage system and the shoring system from minimum 2 ft. below the anticipated excavation grade and extend to top of grade.
- **Block-Outs:** The MiraPLY should extend into any block-out area a minimum of 6" beyond any rebar to provide clearance and allow proper tie-in or detailing. The MiraPLY should be protected from uv, physical damage and burning/cutting operations. When space between the edge of the block out and a dewatering well, column, penetration, tieback head, etc. may be limiting the Waterproofing Contractor enough space and access to allow proper detailing, consider the use of rebar couplers to provide the 6" clearance.
- **Tieback De-Tension:** If tiebacks (soil anchors) will be removed, the blindside waterproofing system must be protected from burning/cutting operations.

Footnotes:

1. "ICRI" refers to the International Concrete Repair Institute, Inc.
Website: www.icri.org Phone: (651) 366-6095
2. "ACI" refers to the American Concrete Institute
Website: www.concrete.org Phone: (248) 848-3700

Technical Bulletins

MIRAPLY WATERPROOFING – USE WITH SHOTCRETE FOUNDATION WALLS

This Technical Bulletin is provided to support the installation of the CCW MiraPLY Blindside Waterproofing System for structural below grade walls constructed of shotcrete. The sequencing and coordination with the General Contractor, Waterproofing Contractor, Shotcrete Contractor and other relevant Trades is critical for the success of a blindside waterproofing system.

MiraPLY Detailing: All MiraPLY seams (both side and end laps) shall be installed as per standard CCW requirements with an additional layer of MiraPLY tape. Center the MiraPLY Detail Tape or MiraPLY Seam Tape over all seams and roll firmly into place. If necessary, clean the MiraPLY membrane surface with Carlisle Weathered Membrane Cleaner or apply Sure Seal HP 250 Primer to seam areas to promote tape adhesion.

Steel Reinforcing Anchoring: Penetrations through a blindside waterproofing system to assist with the installation and securing of the rebar should be limited. The use of anchors or mechanical fasteners should be coordinated with and accepted by the Waterproofing Contractor whether penetrating the MiraPLY post membrane installation or installing prior to membrane installation.

Shotcrete Design: The structural shotcrete wall should be designed as per ACI¹ 506.2 – Specification for Shotcrete.

Shotcrete Placement: The shotcrete should be placed as per ACI 506R – Guide to Shotcrete to provide properly consolidated shotcrete with the exception to the waterproofing specific precautions noted within this Technical Bulletin. The blindside waterproofing in the adjacent areas not receiving shotcrete should be protected from shotcrete, shotcrete overspray, shotcrete rebound and shotcrete dust/mist.

Shotcrete Nozzelman: The Nozzelman must have a current “ACI Shotcrete Nozzelman Certification” for shotcrete to be placed against the blindside waterproofing.

Shotcrete Finishing: Bracing, dowels, etc. used to install guide wires (i.e. screed wires) must not penetrate or damage the blindside waterproofing. The installation and removal of guide wires should be coordinated with and accepted by the Waterproofing Contractor.

Footnotes:

1. “ACI” refers to the American Concrete Institute

Website: www.concrete.org Phone: (248) 848 3700

MiraPLY Pre-Install Meeting Checklist

This checklist is provided in addition to traditional Pre-Install topics (e.g. material storage) to support the discussions necessary to ensure that the CCW MiraPLY preapplied waterproofing system is installed correctly, properly coordinated with relevant trades and protected from adjacent work. The General Contractor should take meeting minutes that includes attendance list & any action items, and then distribute accordingly.

General Contractor

- ☐ Project Timing/Schedule
- ☐ Sequencing & Coordination with Trades
- ☐ First Point Verification
- ☐ Protection of Waterproofing (e.g. high traffic areas)
- ☐ Site Construction
- ☐ Subbase (mud slab or compacted fill)
- ☐ Dewatering
- ☐ Crane Pad (other “Block-outs”)
- ☐ Slab Anchor (Detailing)
- ☐ Shoring System/Soil Retention
- ☐ Soil Retention Anchors (i.e. tie-backs)
- ☐ Rakers/Whalers (Detailing & Removal)

Steel Reinforcement

- ☐ Design – Slab & Wall (thickness and spacing)
- ☐ Support type – Slab & Wall (chairs, dobies, etc.)
- ☐ Anchoring (how & where)

Utilities (Mechanical, Electrical & Plumbing)

- ☐ Type, Locations & Spacing
- ☐ Support and Anchoring
- ☐ Grounded Electrical System (non-braided)

Formwork

- ☐ Headers, Bulkheads, Pour-Stops (how and where)
- ☐ Single-Sided Form (how and where)
- ☐ Form Stripping (for post-applied tie-in)

Concrete Placement

- ☐ Sequencing and Locations
- ☐ Protection from Oversplash
- ☐ Compaction/Consolidation (Type & Method)
- ☐ MiraSTOP waterstop (where & who)

MiraPLY Pre-Install Meeting Checklist

Shotcrete Placement

- ☐ Sequencing and Locations
- ☐ Protection from Overspray
- ☐ Pre-Construction Mockup (ACI Core Grading)
- ☐ ACI Nozzleman Certification
- ☐ MiraSTOP waterstop (where & who)

Owner's Rep/Consultant

- ☐ Quality Assurance (Hold-Points)
- ☐ Documentation/Photos (Inspection Reports)
- ☐ Inspection Report Distribution
- ☐ Repair Procedures

Miscellaneous

- ☐ Transition/Termination at Grade Detail
- ☐ Shoring System Removal (e.g. cutting soldier piles)
- ☐ Interior Well Point (Dewatering)
- ☐ Multi-Phase (future tie-in Detail)
- ☐ Post-Applied Tie-In Detail (e.g. MiraDRI at wall)
- ☐ Perimeter Drainage System (e.g. MiraDRAIN HC)

Tools of the Trade

This list of tools and equipment is required on most projects. Depending on the size, scope and complexity of the project, additional tools and equipment may be required. The applicator should familiarize themselves with the proper use of each tool/equipment and follow the manufacturer's recommended safety equipment.

Required tools for proper installation of the CCW MiraPLY membranes

- Small rubber seam roller
- Aluminum "V" Roller
- Sharp utility knife
- Rags for applying weathered membrane cleaner
- Tape measure
- Tools for Mechanically Attaching CCW MiraPLY-V to Lagging
- Paint Brush or Paint Roller for applying primer and CCW 703-V
- Use a variable-speed ½" drill with mixing paddle
- Proper Safety Equipment

Recommend tools for easing the installation of the CCW MiraPLY Membranes

- Large 2 handed 7½" rubber roller for sealing seams
- Straight edge for cleaner cuts and less waste
- Scissors for small detail cuts
- Sharpie Markers for Pre-Marking Membrane prior to cutting
- Hand Cleaner

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