

A 3D cutaway diagram of a roof assembly. The base is a brick wall. On top of the wall is a concrete slab. A white waterproofing membrane is applied over the concrete. A metal flashing is installed over the membrane. A wooden batten is placed over the flashing. A metal roof panel is installed over the batten. The diagram shows the cross-section of the roof assembly, including the brick wall, concrete slab, waterproofing membrane, metal flashing, wooden batten, and metal roof panel. The text 'Place Metal Roof Panel' is visible on the metal roof panel.

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## INTRODUCTION

[SOPREMA®](#) offers a wide range of single ply roofing products and accessories formulated and manufactured with proven KEE technology. SENTINEL® KEE provides the utmost in durability and reliability to ensure structures remain watertight. SENTINEL® KEE products can be applied using a variety of methods allowing the flexibility to complete the job within project parameters in virtually any climate.

SENTINEL® products carry the proven durability of trusted KEE formulated by [SOPREMA®](#), while offering numerous additional physical and mechanical benefits. SENTINEL® KEE membranes reinforced with polyester provides exceptional puncture resistance, toughness, and high elongation properties and exhibits excellent dimensional stability. Polyester reinforced SENTINEL® KEE membranes have been proven to withstand extreme exposures to cover any design need.

Refer to current [SOPREMA®](#) product data sheets and safety data sheets for detailed information about each product discussed in this manual. For additional information refer to [www.soprema.us](http://www.soprema.us) or contact [SOPREMA®](#) at 800.356.3521.



## DISCLAIMER

This manual is intended for use by [SOPREMA®](#) authorized roofing contractors and design professionals in order to provide instructions and details for the application of [SOPREMA®](#) KEE roofing when a [SOPREMA®](#) warranty will be requested upon project completion. The contents of this manual are believed to be consistent with good roofing 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 design of any particular project.

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

## 1 GENERAL

### 1.1 CHEMICAL RESISTANCE

- SENTINEL® KEE membranes have been evaluated for exposure and compatibility to the following materials:
  - Acrylic paint
  - Bleach
  - Copper sulfate
  - Detergent solutions
  - Ferric chloride
  - Fertilizer solutions
  - Fiberglass matting
  - Fruit juices
  - Furnace residues
  - Hydrogen peroxide
  - Latex paint
  - Linseed oil
  - Lard (animal fats)
  - Masonry cleaner
  - Muriatic acid
  - Oleic acid
  - Phosphoric acid
  - Polypropylene
  - Sodium hydroxide
  - Zinc chloride
- Inadvertent exposure to foreign materials, debris and other contaminants should be addressed by proper removal and cleaning. Refer to [Section 1.2](#).
- The following roofing materials are incompatible with SENTINEL® KEE:
  - Asphalt-based roofing and flashing products.
  - Coal tar pitch.
  - Un-faced extruded and expanded polystyrene.
- SOPREMA® SBS roofing materials should not be overlapped onto SENTINEL® KEE. Self-adhesive SBS will become soft and liquify if overlapped onto SENTINEL membrane and flashing products.
- These incompatible materials must be eliminated or separated from direct contact with bare KEE membranes and flashings.
- Contact [SOPREMA®](#) for additional information.

## 1.2 KEE CLEANING PROCEDURES

### 1.2.1 HOUSEHOLD CLEANER

*General:*

- Follow all safety and environmental regulations and requirements regarding the use of household cleaners.
- SENTINEL® KEE roofing may be cleaned using common household cleaners such as Simple Green®, Formula 409®, Spic and Span® or other mild household cleaners.
- Pre-rinse the area using low-pressure water, less than 1,200 psi, with wide-angle fan spray nozzle.
- Follow the household cleaner instructions; dilute the cleaner using clean water as required. Do not pour undiluted cleaner directly onto roof surface.
- Clean the area using a cloth, sponge, soft bristle brushes or push brooms.
- Where necessary, use a general purpose scrubbing pad and cleaner to remove stubborn contaminants. Do not use sharp metal tools or wire brushes.
- Rinse the area using low-pressure water directed downward to prevent water from entering equipment, walls, windows or roof flashings.
- Repeat cleaning as necessary.
- The contractor and/or applicator is responsible for managing and controlling all exposures related to chemical hazards, toxic substances and odors. This includes personal protective equipment (PPE), administrative and work practice controls, and engineering controls. The contractor is responsible for the elimination or substitution of products as necessary to manage and control exposures related to chemical hazards, toxic substances and odors.
- 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.
- Contact [SOPREMA®](#) for additional information.

### 1.2.2 SOLVENT CLEANER

*General:*

- Follow all safety and environmental regulations and requirements regarding the use of cleaners.
- KEE membranes may be cleaned using solvents such as methyl ethyl ketone (MEK).
- Do not pour solvent directly onto roof surface.
- Clean the area using a damp cloth soaked in solvent.
- Where necessary, use a general purpose scrubbing pad and solvent to remove contaminants. Do not use sharp tools or wire brushes.
- Allow the solvent to evaporate, or wipe the surface using a dry cloth where necessary.
- Repeat cleaning as necessary.
- The contractor and/or applicator is responsible for managing and controlling all exposures related to chemical hazards, toxic substances and odors. This includes personal protective equipment (PPE), administrative and work practice controls, and engineering controls. The contractor is responsible for the elimination or substitution of products as necessary to manage and control exposures related to chemical hazards, toxic substances and odors.
- 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.
- Contact [SOPREMA®](#) for additional information.

## 1.3 HOT-AIR WELDING PROCEDURES

### 1.3.1 AUTOMATIC WELDING

#### *General:*

- Automatic hot air welding equipment is required to achieve consistent watertight membrane seam welds.
- Refer to hot air welding equipment manufacturer's published operating instructions and follow all applicable requirements and recommendations.
- The contractor and/or applicator is responsible for managing and controlling all exposures related to chemical hazards, toxic substances and odors. This includes personal protective equipment (PPE), administrative and work practice controls, and engineering controls. The contractor is responsible for the elimination or substitution of products as necessary to manage and control exposures related to chemical hazards, toxic substances and odors.
- 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.

#### *Preparation:*

- Ensure a safe and consistent power supply is available and maintained for the welding equipment throughout the installation.
- Conduct test welds before the roofing installation to ensure equipment settings consistently achieve satisfactory welded seams. Repeat test welds when the welder has been turned off and re-started, and as environmental conditions change significantly. Changes in environmental conditions such as temperature and humidity can have an effect on the quality of welds.
  - Use clean, dry KEE cut into strips as necessary to create sample side-laps to weld and test.
  - Set the welding equipment temperature and speed settings, adjust as necessary, to achieve satisfactory welded seams.
  - Weld a 1-1/2 in continuous weld and allow the sample to cool.
  - Cut the welded sample in 1 to 2 in wide test strips.
  - Peel the test strips apart at the weld.
  - A satisfactory weld is achieved when the KEE breaks, or consistently and uniformly delaminates from the reinforcing fabric.
- Before welding roofing seams, ensure the area within the seams is dry, clean and free of debris.
- Clean the KEE surfaces as necessary. Refer to [Section 1.2](#).

#### *Application:*

- Position and align the automatic welder at the lap. Ensure the press wheel is positioned over the edge of the lap being welded.
- Set the temperature and speed settings as determined from sample test welds.
- Insert the welding shoe 2 in within the lap to ensure a minimum 1-1/2 in continuous weld is always produced.
- When the weld is complete and the welding shoe is disengaged, examine the welding shoe for residue.
- Ensure the welding nozzle remains clean. Remove residue accumulations from the nozzle using a wire brush.

#### *Inspection:*

- Carefully probe all seams and t-joints using a rounded-tip probe such as a cotter pin puller. Prevent damage to the membrane during inspection.
- Repair all open seams and damage found during inspection.

- When seam weld quality is suspect, inspect laps using destructive examination methods.
  - Cut 2 in wide weld samples across the seam 6 in on either side of the weld (2 in x 12 in wide strip).
  - Cut a minimum of three (3) sample welds in each suspect area.
  - Peel the test strips apart at the welds.
  - A satisfactory weld is achieved when the KEE breaks, or consistently and uniformly delaminates from the reinforcing fabric.
- Ensure the membrane is repaired and sealed watertight each day.

### 1.3.2 HAND WELDING

#### *General:*

- Hand-held hot-air welding equipment should be used where automatic welding equipment is not possible.
- Hand held welding equipment should be used to weld KEE to vinyl coated metal, small detail work, repairs and other work not accessible to automatic welding equipment.
- Refer to hot-air welding equipment manufacturer's published operating instructions and follow all applicable requirements and recommendations.
- The contractor and/or applicator is responsible for managing and controlling all exposures related to chemical hazards, toxic substances and odors. This includes personal protective equipment (PPE), administrative and work practice controls, and engineering controls. The contractor is responsible for the elimination or substitution of products as necessary to manage and control exposures related to chemical hazards, toxic substances and odors.
- 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.

#### *Preparation:*

- Ensure an adequate and consistent power supply for welding equipment is provided and maintained at all times.
- Conduct test welds during the roofing installation to ensure equipment settings consistently achieve satisfactory welded seams.
  - Use clean, dry KEE cut into strips as necessary to create sample side-laps to weld and test.
  - Set the welder temperature, adjust as necessary, to achieve satisfactory welded seams.
  - Weld a 1-1/2 in continuous weld and allow the sample to cool.
  - Cut the welded sample in 1 to 2 in wide test strips.
  - Peel the test strips apart at the welds.
  - A satisfactory weld is achieved when the KEE breaks, or consistently and uniformly delaminates from the reinforcing fabric.
- Before welding roofing seams, ensure the area within the seams is dry, clean and free of debris.
- Clean the KEE surfaces as necessary. Refer to [Section 1.2](#).

#### *Application:*

- Insert the welding nozzle 2 in or more within the membrane lap and heat both surfaces sufficiently to fuse the lap.
- While still hot, use a silicone roller and apply sufficient pressure to ensure the two membranes are pressed and fused together.
- Consistently weld along the lap to ensure a minimum 1-1/2 in continuous weld is produced.
- Ensure the welding nozzle remains clean. Remove residue accumulations from the nozzle using a wire brush.

#### *Inspection:*

- Carefully probe all seams and t-joints using a rounded-tip probe such as a cotter pin puller. Prevent damage to the membrane during inspection.
- Repair all open seams and damage found during inspection.
- When seam weld quality is suspect, inspect laps using destructive examination methods.
  - Cut 2 in wide weld samples across the seam 6 in on either side of the weld (2 in x 12 in wide strip).



- Cut a minimum of three (3) sample welds in each suspect area.
  - Peel the test strips apart at the welds.
  - A satisfactory weld is achieved when the KEE breaks, or consistently and uniformly delaminates from the reinforcing fabric.
- Ensure the membrane is repaired and sealed watertight each day.

## 2 KEE FIELD MEMBRANES

### 2.1 ADHERED KEE FIELD MEMBRANES

#### *General:*

- SENTINEL® KEE field membranes may be adhered for new and roof recover applications. For mechanically fastened field membranes, refer to [Section 2.2](#). For induction welded field membranes, refer to [Section 2.3](#).
- Adhered SENTINEL® KEE field membranes are polyester reinforced, 60 or 80 mils thick, and are bare or fleece-backed. Refer to [Table 2.1a](#).
- KEE field membranes may be adhered to approved substrates using [SENTINEL® S BONDING ADHESIVE](#), [SENTINEL® H2O BONDING ADHESIVE](#), [DUOTACK® SPF HFO](#), or ICP Polyset® Commercial Roof Adhesive. Refer to [Table 2.1b](#).
- The contractor and/or applicator is responsible for managing and controlling all exposures related to chemical hazards, toxic substances and odors. This includes personal protective equipment (PPE), administrative and work practice controls, and engineering controls. The contractor is responsible for the elimination or substitution of products as necessary to manage and control exposures related to chemical hazards, toxic substances and odors.
- 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.
- Refer to safety data sheets and product data sheets for additional information.

#### *Preparation:*

- Ensure environmental conditions are acceptable to proceed. Monitor precipitation, temperature, humidity, dew point temperature, wind, cloud cover and sun that may have an effect on materials and application.
- The ambient temperature should be above 40°F (4°C) and rising during application. During extended periods of cold weather, KEE materials should be stored in a warm, heated storage area for optimum performance.
- Conditions should remain dry, and the ambient temperature should be well above the dew point at all times during roofing application.
- Water-based adhesive should not be stored or used when temperatures are below 40°F (4°C).
- Before beginning application, unroll the KEE membrane and allow it to relax.
- Roof recover:
  - Ensure existing roofing systems have been thoroughly evaluated and are determined to be structurally sound, dry and meet all applicable requirements for roof recover.
  - Remove or otherwise prepare existing surfacings such as gravel, membranes or coatings to ensure the surface is smooth and will provide a satisfactory substrate for new SENTINEL® KEE.
  - Ensure existing substrates will accommodate the new roof recover system to provide positive slope for adequate roof drainage.
  - Remove all existing incompatible materials or separate incompatible materials from direct contact with bare KEE. Refer to [Section 1.1](#) or contact [SOPREMA®](#) for additional information.
  - Refer to insulation and cover board installation guidelines for fastening and adhering recover boards and insulation to existing roofing.
- Adhesion/peel tests are encouraged for lightweight concrete, structural concrete, masonry and other substrates where surface conditions may vary. Conduct 180 degree peel tests as follows:
  - Choose three (3) or more representative substrate areas to examine.
  - Clean and prepare the substrate as specified, allow to dry.
  - Cut 2 in (5.08 cm) wide or more by 12 in (30.48 cm) long strips of the specified membrane.

- Adhere an 8 to 9 in (20.32 to 22.86 cm) long section of the 12 in (30.48 cm) strip and allow a 3 to 4 in (7.62 to 10.16 cm) long portion to remain un-adhered in order to grip and pull.
- Allow sufficient time for the samples to cure.
- Grip the un-adhered portion of the sample and pull 180 degrees and parallel with the surface. Use a small scale to measure results in pounds of resistance where quantitative results are desired.
- Results should demonstrate strong resistance to peel. A strong bond will result in significant residual materials remaining adhered to the substrate, or part of the substrate itself may be removed along with the sample.
- Samples that peel away easily from the substrate may indicate further preparation is needed, or alternate materials and/or application methods may be necessary.
- Where quantitative measurements of peel resistance are desired, the peel resistance should exceed 2 lbf per lineal inch of sample width (e.g. a 2 in wide sample should exceed 4 lbf and the sample should not peel away “clean” from the substrate).
- Take photos or videos of the samples and the substrate to record conditions.

*Application:*

- [SENTINEL® S BONDING ADHESIVE:](#)
  - For use with bare KEE only.
  - Use a minimum 3/8 in nap, solvent resistant roller to apply adhesive. Dip the roller into the adhesive to fully coat the roller. Do not pour adhesive onto the substrate and do not allow adhesive to pool or puddle on the substrate.
  - Evenly apply adhesive to clean, dry and prepared substrate while applying adhesive to the back of the bare KEE membrane.
  - Prevent adhesive from contaminating the KEE lap seams to be welded.
  - Apply uniform adhesive coverage as indicated on product data sheet. Adjust the application rate based on environmental conditions, substrate roughness and porosity.
  - Allow the adhesive on both surfaces to become tacky but not wet. The adhesive should not transfer to the finger or string when touched.
  - Prevent dust and debris from contaminating adhesive.
  - During humid weather, and during periods when the temperature is near the dew point temperature, examine surfaces closely for condensation.
  - Do not install if condensation forms on the adhesive surface. During humid conditions condensation may form on the adhesive surface due to evaporative cooling that occurs when the solvent evaporates.
  - Mate the membrane to the substrate for adhesive-to-adhesive contact.
  - Apply pressure using a weighted roller or push broom to ensure complete adhesion and prevent wrinkles and air bubbles.
- [SENTINEL® H2O BONDING ADHESIVE:](#)
  - For use with fleece-backed KEE only.
  - Use a minimum 3/8 in nap, solvent resistant roller to apply adhesive. Dip the roller into the adhesive to fully coat the roller. Do not pour adhesive onto the substrate and do not allow adhesive to pool or puddle on the substrate.
  - Apply uniform adhesive coverage to the substrate as indicated on product data sheet. Adjust the application rate based on environmental conditions, substrate roughness and porosity.
  - Prevent adhesive from contaminating the KEE lap seams to be welded.
  - Ensure the adhesive is tacky to the touch but does not dry or skin over.
  - Mate the membrane to the substrate.
  - Apply pressure using a push broom to ensure complete adhesion and prevent wrinkles and air bubbles.

- Do not apply [SENTINEL® H2O BONDING ADHESIVE](#) when the temperature is at or below 40°F (4°C) or when the temperature is forecast to be at or below 40°F (4°C) during the 48 hour period following the application of [SENTINEL® H2O BONDING ADHESIVE](#).
- Do not apply [SENTINEL® H2O BONDING ADHESIVE](#) when the temperature is at or below the dew point temperature. Closely monitor adhesion when temperatures are near the dew point temperature, typically in the morning and evening hours as well as periods of high humidity.
- [DUOTACK® SPF HFO](#):
  - For use with fleece-backed KEE only.
  - Refer to published instructions.
  - Spray-apply the foam adhesive to clean, dry and prepared compatible substrates.
  - Ensure the adhesive spray pattern provides for complete membrane adhesion.
  - Prevent adhesive over-spray from contaminating the KEE lap seams to be welded.
  - Ensure the adhesive is tacky to the touch but does not dry or skin over.
  - Mate the membrane to the substrate while applying pressure using a push broom to ensure complete adhesion and prevent wrinkles and air bubbles.
- ICP Polysat® Commercial Roof Adhesive:
  - For use with fleece-backed KEE only.
  - Refer to the adhesive manufacturer's published instructions.
  - Spray-apply the foam adhesive to clean, dry and prepared compatible substrates.
  - Ensure the adhesive spray pattern provides for complete membrane adhesion in accordance with adhesive manufacturer's requirements.
  - Prevent adhesive over-spray from contaminating the KEE lap seams to be welded.
  - Examine the adhesive in accordance with adhesive manufacturer's requirements, ensure the adhesive is tacky to the touch but does not dry or skin over.
  - Mate the membrane to the substrate while applying pressure using a push broom to ensure complete adhesion and prevent wrinkles and air bubbles.
- At the end of the field sheet where it terminates at roof edges, walls and penetrations, fasten the membrane with appropriate fasteners and seam plates.
- Secure the membrane to the deck or vertical surface at the base of the upstand. Refer to [Figures 2.1a through 2.1i](#).
- Clean all laps as necessary before welding. Refer to [Section 1.2](#).
- Hot-air weld all laps watertight. Refer to [Section 5.1](#).

*Inspection:*

- Carefully probe all seams using a rounded-tip probe such as a cotter pin puller. Prevent damage to the membrane during inspection.
- Inspect all t-joints to ensure all t-joints have t-joint patches.
- Repair all open seams and damage found during inspection.
- When seam weld quality is suspect, inspect laps using destructive examination methods.
  - Cut 2 in wide weld samples across the seam 6 in on either side of the weld (2 in x 12 in wide strip).
  - Cut a minimum of three (3) sample welds in each suspect area.
  - Peel the test strips apart at the welds.
  - A satisfactory weld is achieved when the KEE breaks, or consistently and uniformly delaminates from the reinforcing fabric.
- Inspect the membrane each day to ensure the membrane is adhered to the substrate.
- Each day, repair all un-adhered voids, wrinkles, open and damaged laps, and all other deficiencies before proceeding.
- Temporary night seals are required to seal membrane terminations watertight. Remove all temporary night seals before resuming the installation.

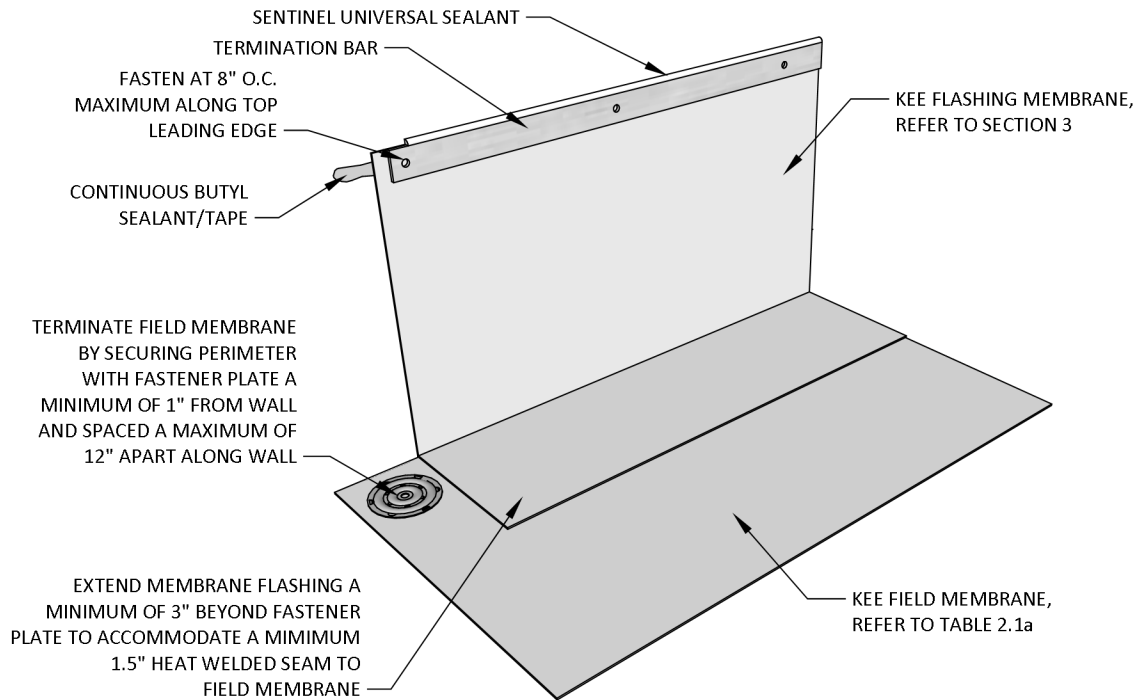
- Ensure the membrane is sealed watertight each day.

<b>Table 2.1a Adhered KEE Field Membranes</b>			
Membrane	Thickness	Reinforcement	Backing
<a href="#">SENTINEL® KEE P150</a>	60 mils	Polyester	Bare
<a href="#">SENTINEL® KEE P200</a>	80 mils	Polyester	Bare
<a href="#">SENTINEL® KEE P150 HFB</a>	60 mils	Polyester	Fleece
<a href="#">SENTINEL® KEE P200 HFB</a>	80 mils	Polyester	Fleece

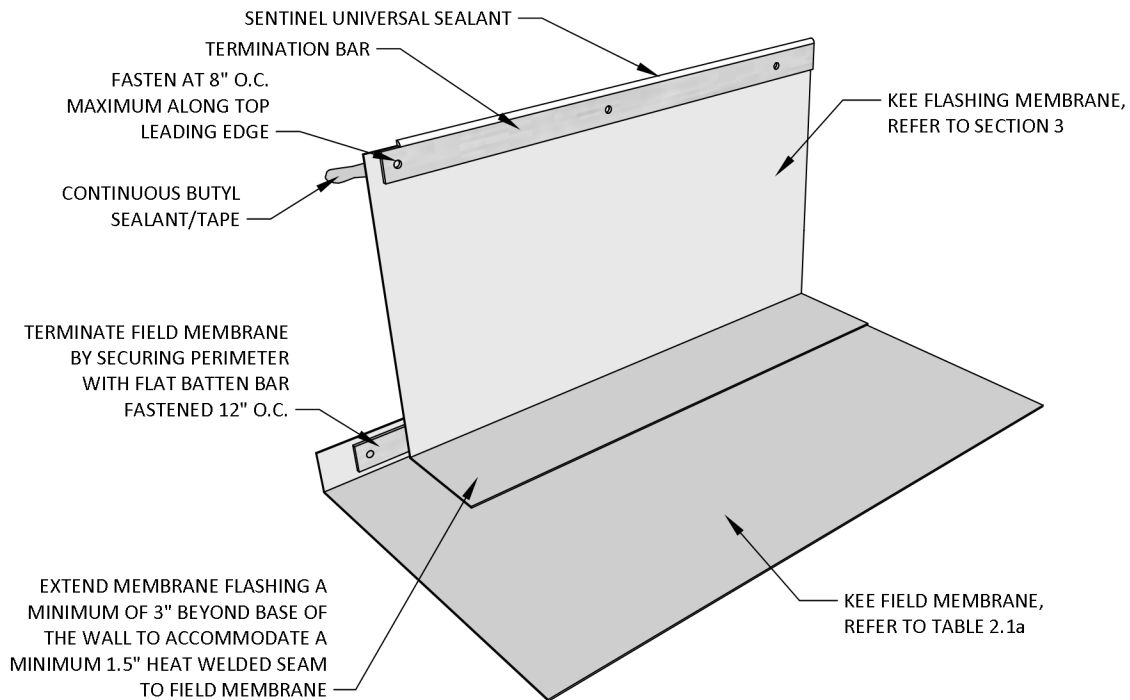
<b>Table 2.1b Substrates for Adhered KEE Field Membranes</b>		
Substrate	Adhesive	KEE Field Membrane
Concrete	<a href="#">SENTINEL® S BONDING ADHESIVE</a>	All bare adhered KEE field membranes. Refer to <a href="#">Table 2.1a</a> .
	<a href="#">SENTINEL® H2O BONDING ADHESIVE</a>	All fleece-backed adhered KEE field membranes. Refer to <a href="#">Table 2.1a</a> .
	<a href="#">DUOTACK® SPF HFO</a>	
	ICP Polyset® Commercial Roof Adhesive	
Approved gypsum roof boards	<a href="#">SENTINEL® S BONDING ADHESIVE</a>	All bare adhered KEE field membranes. Refer to <a href="#">Table 2.1a</a> .
	<a href="#">SENTINEL® H2O BONDING ADHESIVE</a>	All fleece-backed adhered KEE field membranes. Refer to <a href="#">Table 2.1a</a> .
	<a href="#">DUOTACK® SPF HFO</a>	
	ICP Polyset® Commercial Roof Adhesive	
Approved cement roof boards	<a href="#">SENTINEL® S BONDING ADHESIVE</a>	All bare adhered KEE field membranes. Refer to <a href="#">Table 2.1a</a> .
	<a href="#">SENTINEL® H2O BONDING ADHESIVE</a>	All fleece-backed adhered KEE field membranes. Refer to <a href="#">Table 2.1a</a> .
	<a href="#">DUOTACK® SPF HFO</a>	
	ICP Polyset® Commercial Roof Adhesive	
Cellular Lightweight Insulating Concrete <sup>1</sup>	<a href="#">SENTINEL® H2O BONDING ADHESIVE</a>	All fleece-backed adhered KEE field membranes. Refer to <a href="#">Table 2.1a</a> .
	<a href="#">DUOTACK® SPF HFO</a>	
	ICP Polyset® Commercial Roof Adhesive	

Substrate	Adhesive	KEE Field Membrane
Polyisocyanurate insulation boards (cellulose-glass facer)	<a href="#">SENTINEL® S BONDING ADHESIVE</a>	All bare adhered KEE field membranes. Refer to <a href="#">Table 2.1a</a> .
	<a href="#">DUOTACK® SPF HFO</a>	All fleece-backed adhered KEE field membranes. Refer to <a href="#">Table 2.1a</a> .
	ICP Polyset® Commercial Roof Adhesive	
Polyisocyanurate insulation boards (coated glass facer)	<a href="#">SENTINEL® S BONDING ADHESIVE</a>	All bare adhered KEE field membranes. Refer to <a href="#">Table 2.1a</a> .
	<a href="#">SENTINEL® H2O BONDING ADHESIVE</a>	All fleece-backed adhered KEE field membranes. Refer to <a href="#">Table 2.1a</a> .
	<a href="#">DUOTACK® SPF HFO</a>	
	ICP Polyset® Commercial Roof Adhesive	
Granule surfaced modified bitumen roofing <sup>2</sup>	<a href="#">DUOTACK® SPF HFO</a>	All fleece-backed adhered KEE field membranes. Refer to <a href="#">Table 2.1a</a> .
	ICP Polyset® Commercial Roof Adhesive	

1. Contact [SOPREMA®](#) and refer to agency approvals for specific LWIC manufacturers
2. Contact [SOPREMA®](#) for other adhered KEE roof recover options.

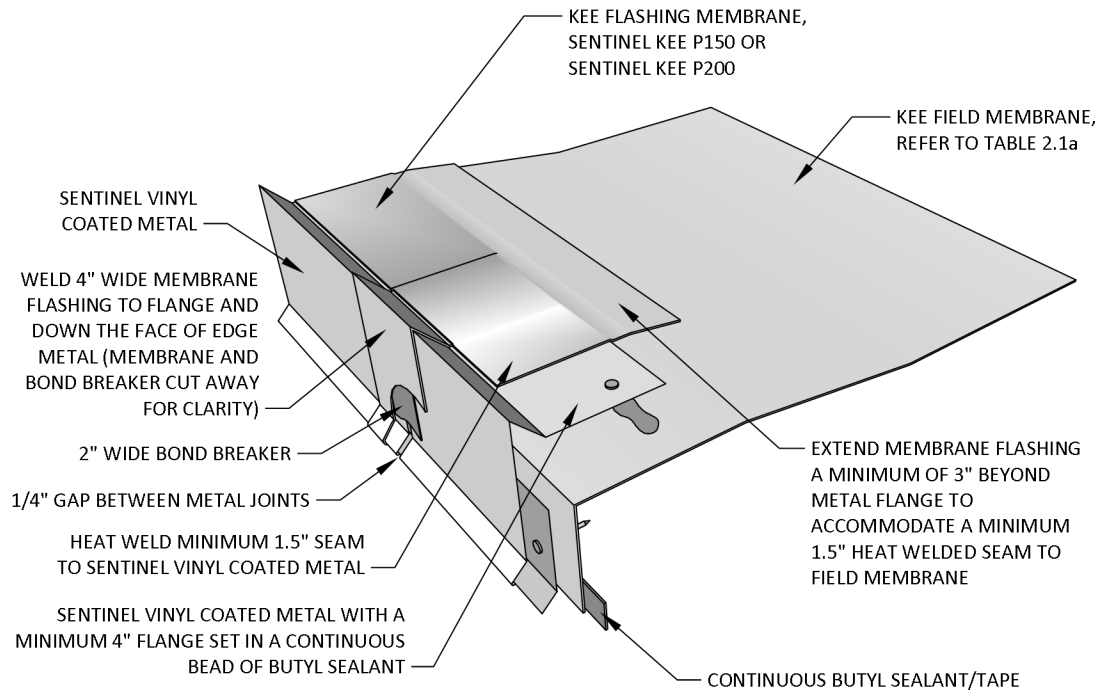


*Figure 2.1a Adhered KEE Field Membrane at Wall/Curb with Horizontal Perimeter Fastening*

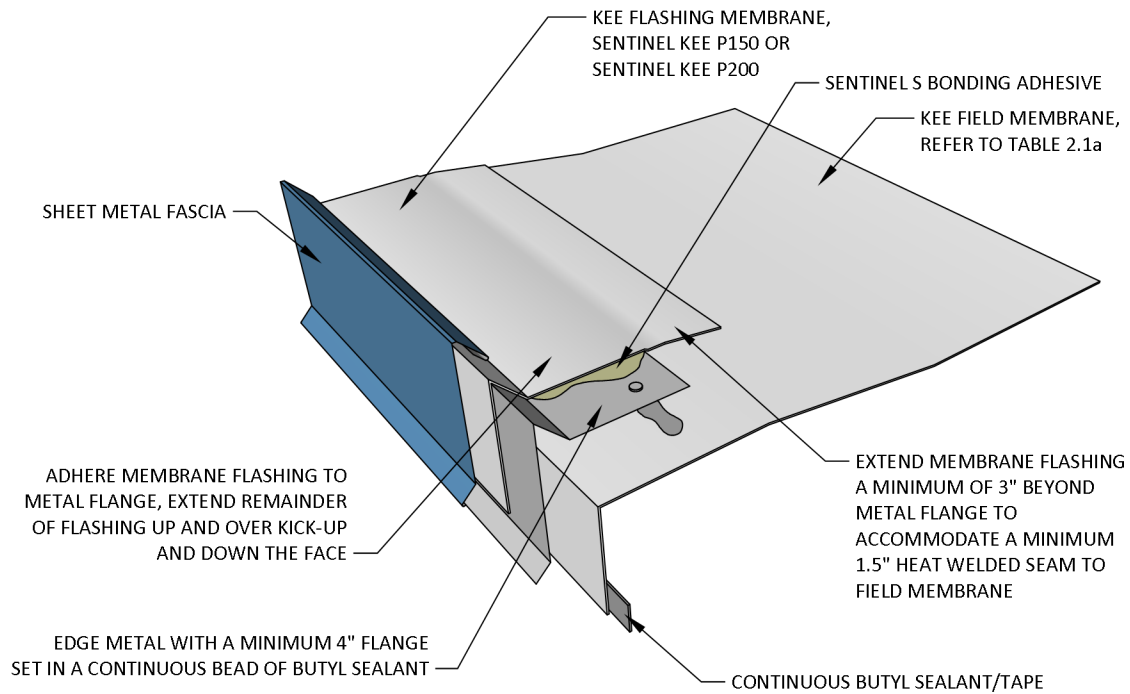


*Figure 2.1b Adhered KEE Field Membrane at Wall/Curb with Vertical Perimeter Fastening*

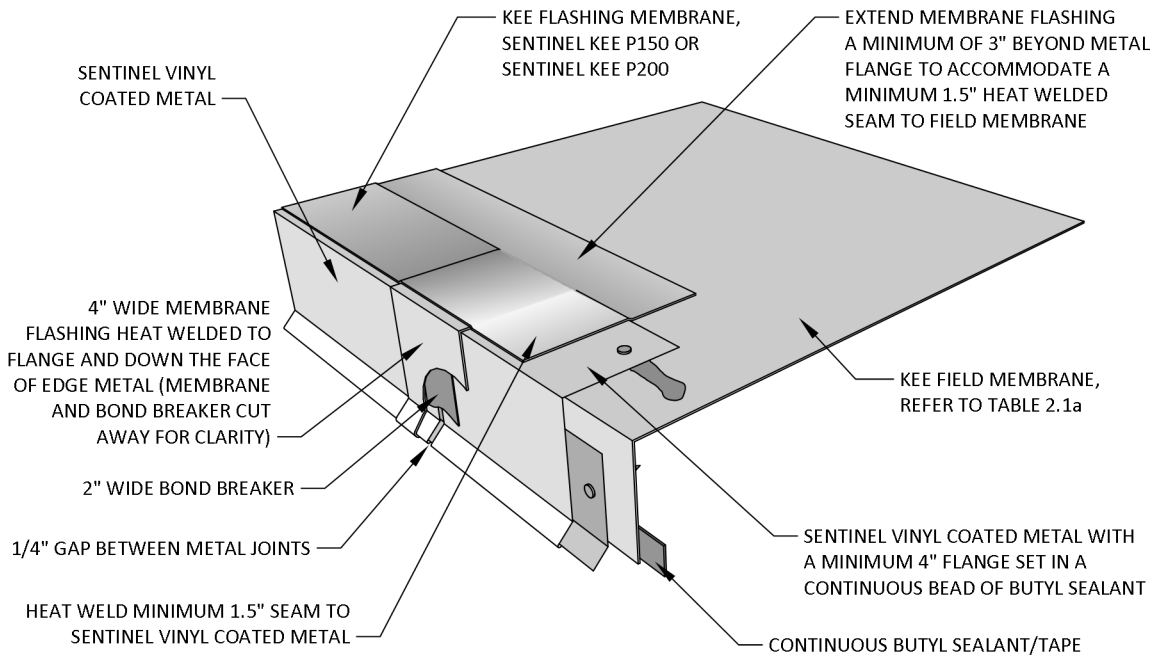




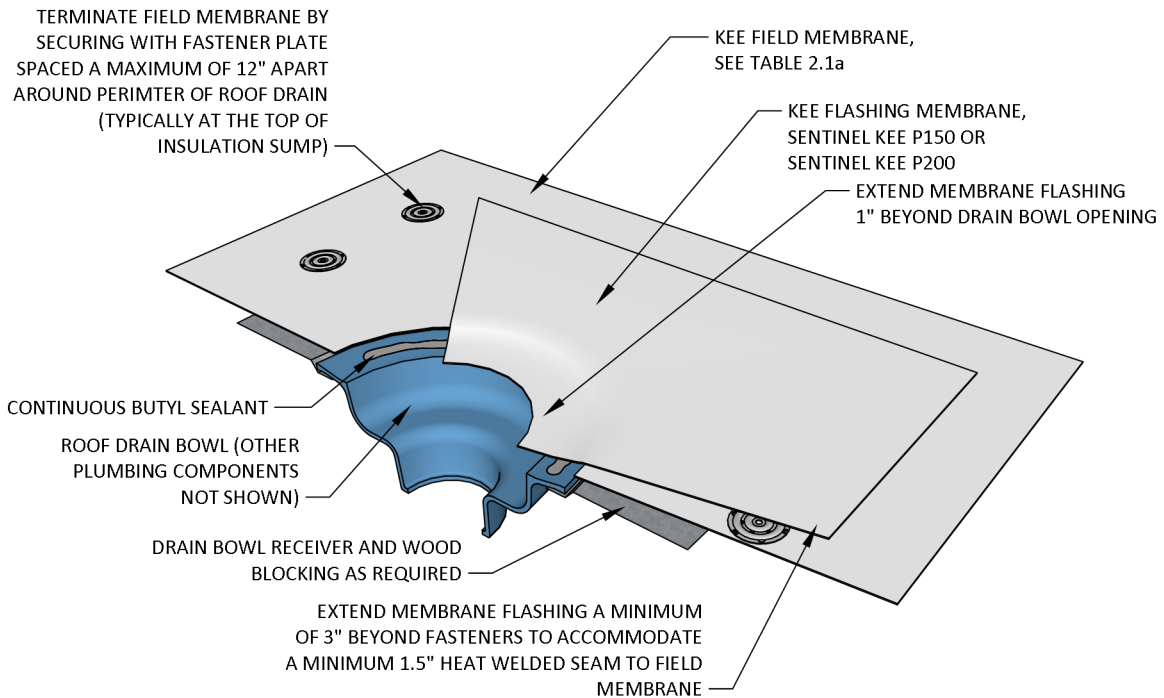
*Figure 2.1c Adhered KEE Field Membrane at Gravel Stop With Vinyl Coated Metal Fascia*



*Figure 2.1d Adhered KEE Field Membrane at Gravel Stop With Sheet Metal Fascia*

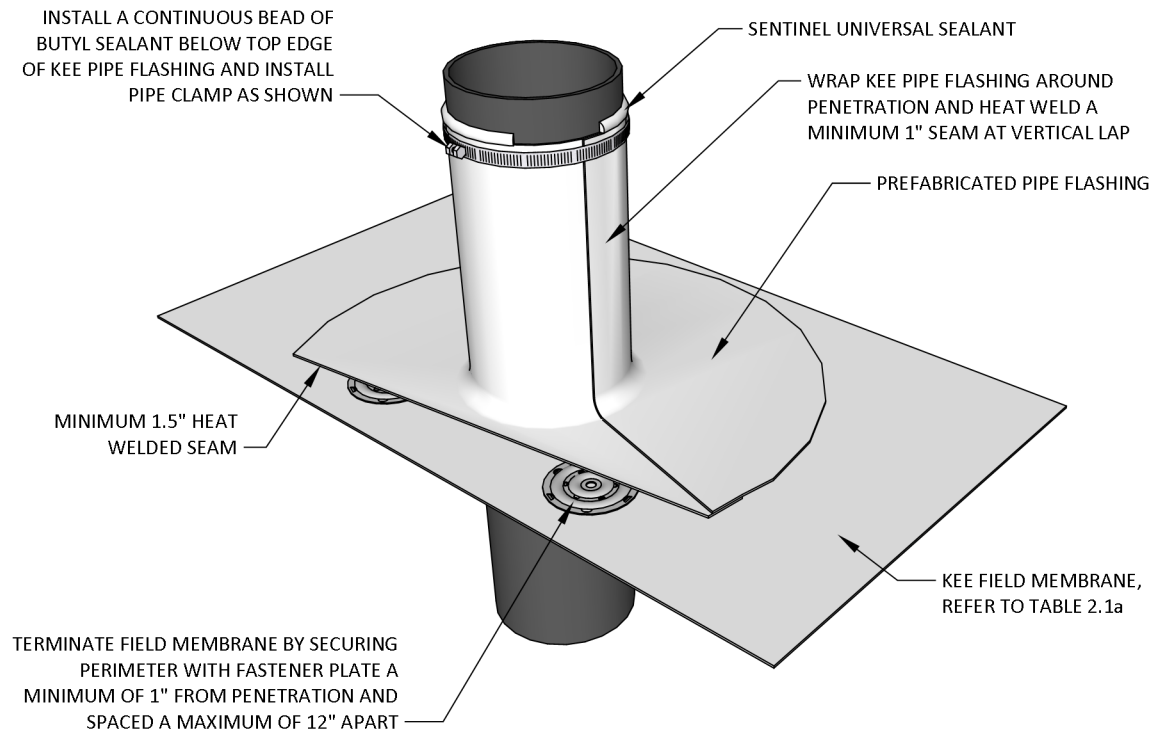


*Figure 2.1e Adhered KEE Field Membrane at Drip Edge*



*Figure 2.1f Adhered KEE Field Membrane at Roof Drain*





*Figure 2.1i Adhered KEE Field Membrane at Penetration With Prefabricated Pipe Flashing*

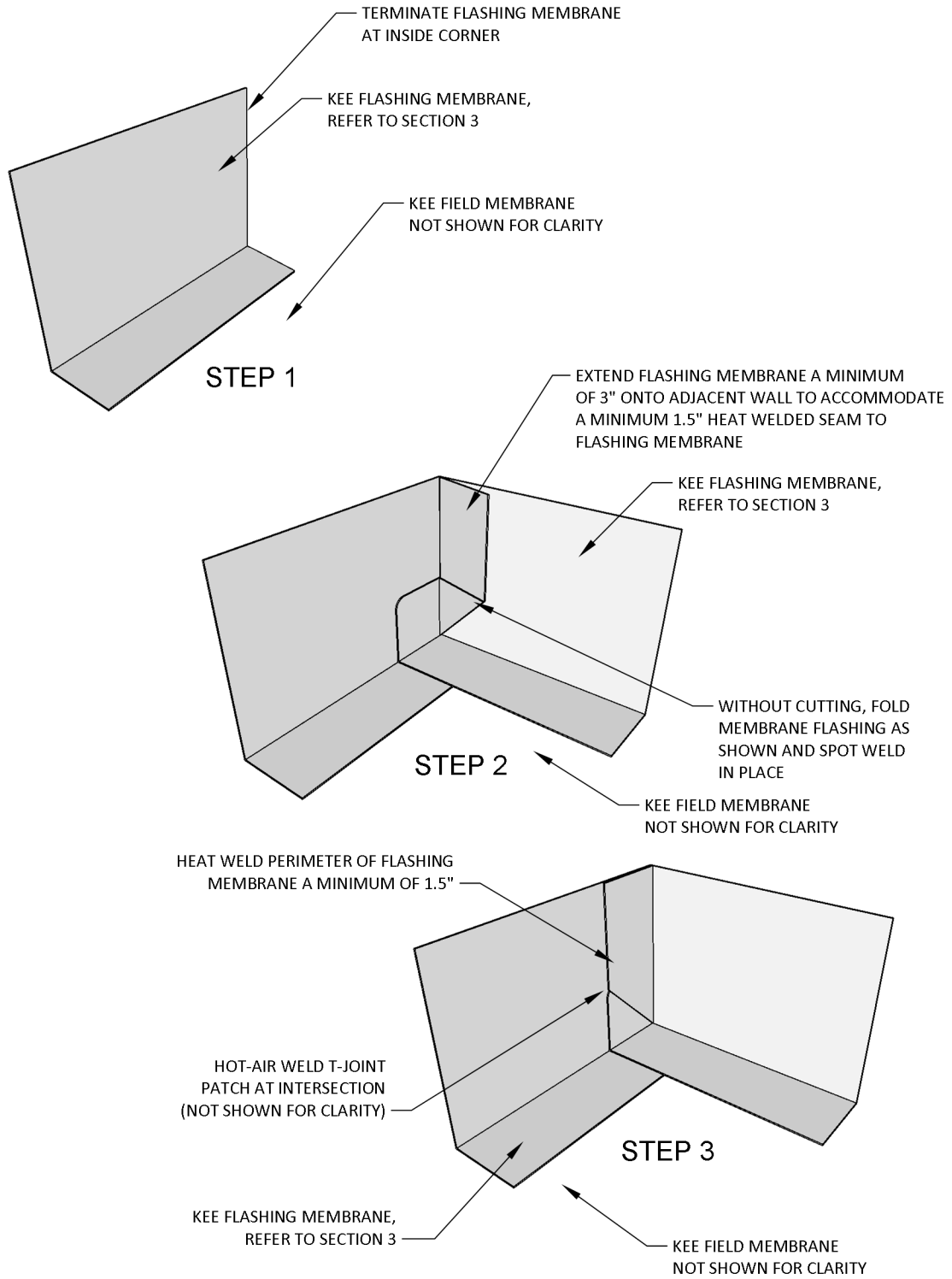
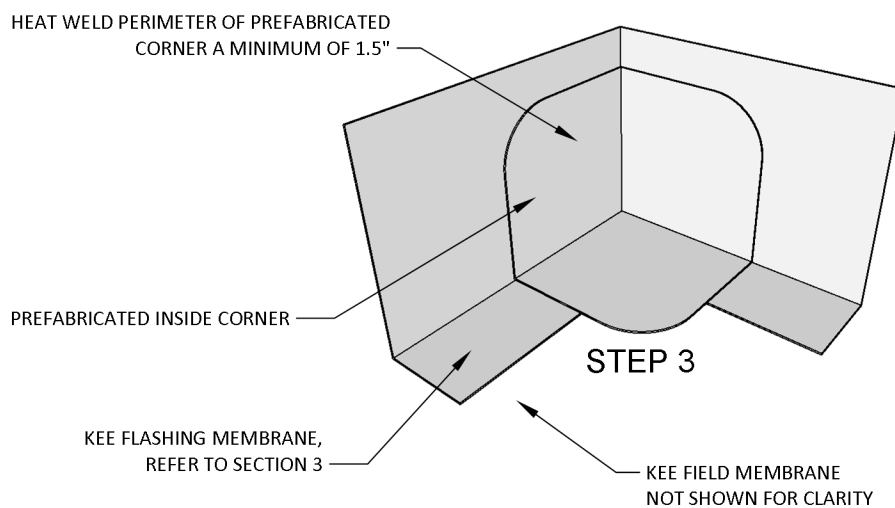
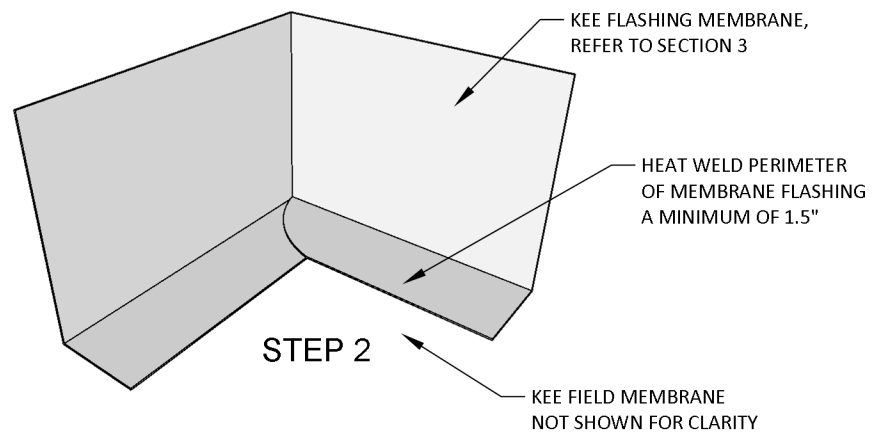
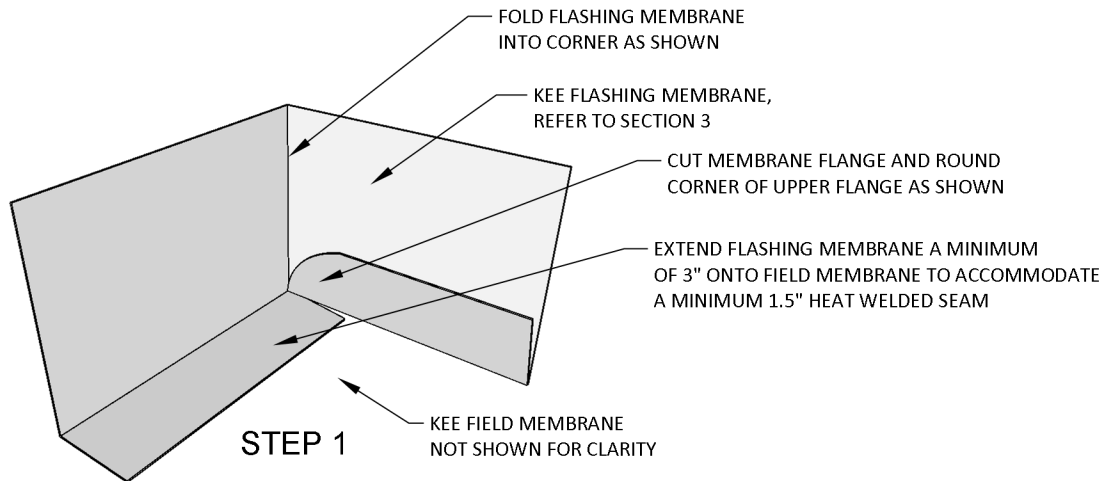
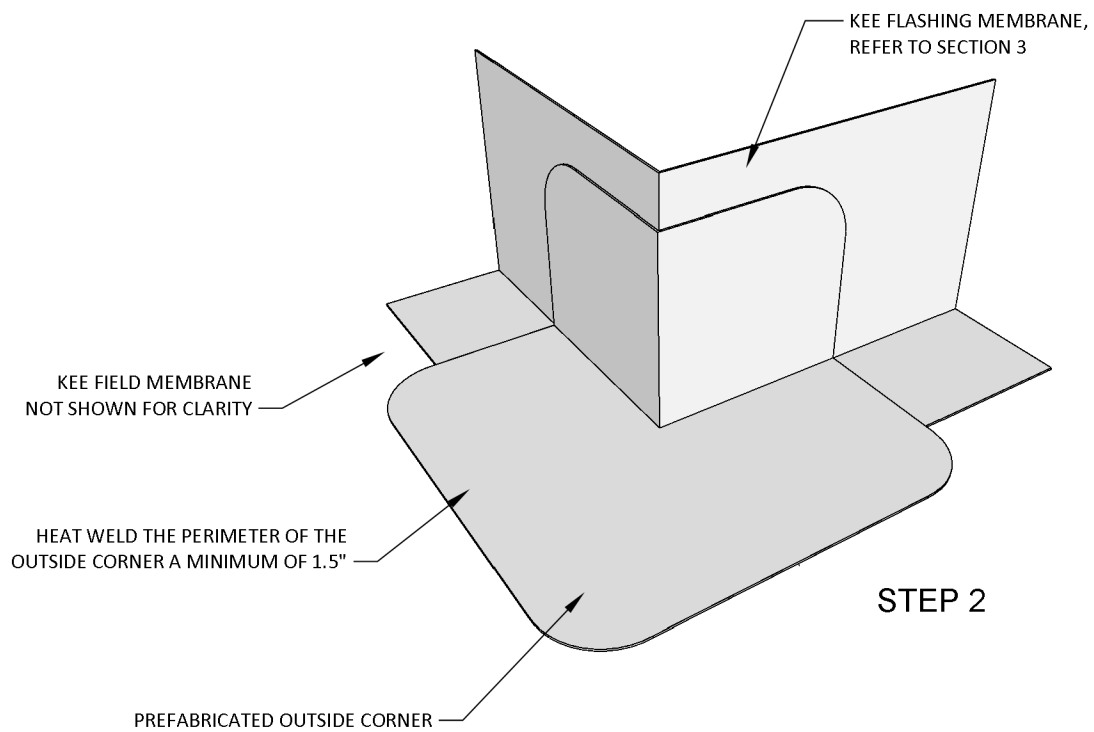
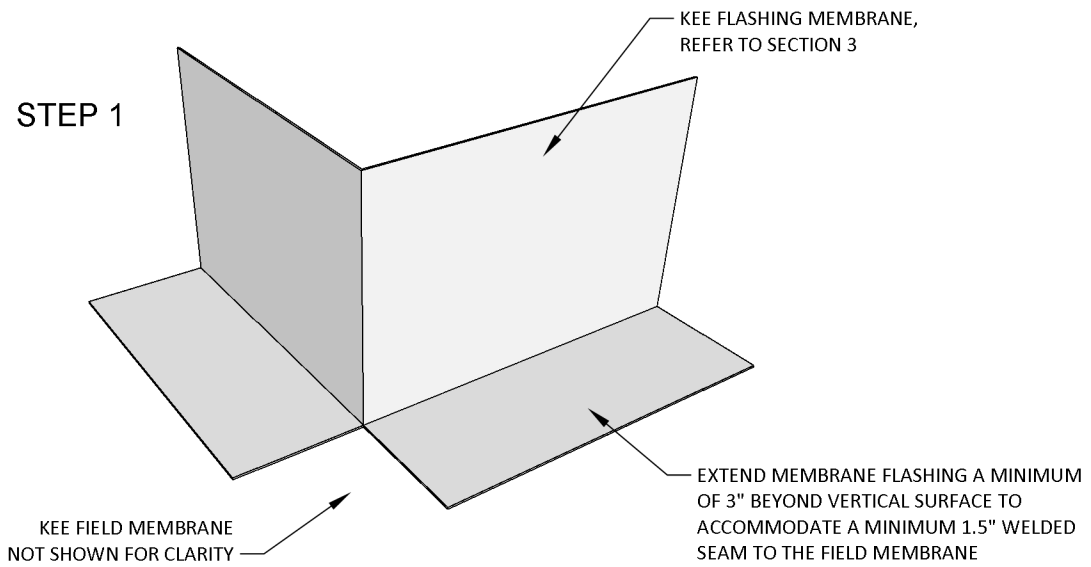


Figure 2.1j Adhered KEE Field Membrane with Field Fabricated Flashing at Inside Corner



*Figure 2.1k Adhered KEE Field Membrane with Prefabricated Flashing at Inside Corner*



*Figure 2.1I Adhered KEE Field Membrane with Prefabricated Flashing at Outside Corner*



## 2.2 MECHANICALLY FASTENED KEE FIELD MEMBRANES

### *General:*

- SENTINEL® KEE field membranes may be mechanically fastened for new and roof recover applications. For adhered field membranes, refer to [Section 2.1](#). For induction welded field membranes, refer to [Section 2.3](#).
- Mechanically fastened SENTINEL® KEE field membranes are polyester reinforced, 60 or 80 mils thick, and are bare or fleeced-backed.
- KEE field membranes are fastened in the membrane side-laps to approved substrates using [SOPREMA®](#) fasteners and seam plates. Refer to fastening patterns at [www.soprema.us](http://www.soprema.us).
- The contractor and/or applicator is responsible for managing and controlling all exposures related to chemical hazards, toxic substances and odors. This includes personal protective equipment (PPE), administrative and work practice controls, and engineering controls. The contractor is responsible for the elimination or substitution of products as necessary to manage and control exposures related to chemical hazards, toxic substances and odors.
- 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.
- Refer to safety data sheets and product data sheets for additional information.

### *Preparation:*

- Ensure the KEE membrane substrate surface has been properly prepared and is clean, dry and free of incompatible materials and debris.
- Examine all roof decks, wall substrates, nailers and other conditions at membrane terminations, transitions and penetrations.
- Ensure the roof deck and all other substrate conditions are acceptable to install the appropriate fasteners.
- Unroll the KEE membrane and allow it to relax.
- Roof recover:
  - Ensure existing roofing systems have been thoroughly evaluated and are determined to be structurally sound, dry and meet all applicable requirements for mechanically fastened roof recover applications.
  - Remove or otherwise prepare existing surfacings such as gravel, membranes or coatings to ensure the surface is smooth and will provide a satisfactory substrate for new SENTINEL® KEE.
  - Ensure existing substrates will accommodate the new roof recover system to provide positive slope for adequate roof drainage.
  - Remove all existing incompatible materials or separate incompatible materials from direct contact with bare KEE. Refer to [Section 1.1](#) or contact [SOPREMA®](#) for additional information.
  - Refer to insulation and cover board installation guidelines for compatible insulation and recover boards, and attachment requirements to existing roofing.

### *Application:*

- Starting at the low point of the roof, lay out the membrane to ensure the plies are installed perpendicular to the roof slope, shingled to prevent back-water laps.
- Remove all wrinkles from the sheet, but do not overstretch the membrane too tight during installation.
- Ensure 6 in side-lap and end-lap widths are maintained.
- Starting at one end of the sheet, install the mechanical fasteners within the 6 in side-lap. Locate the center of the seam plates 2 in from the edge of the sheet. Ensure fastener spacing meets the specified wind uplift resistance requirements. Refer to fastening patterns at [www.soprema.us](http://www.soprema.us).
- Install fasteners as necessary to firmly set the fastener and seam plate tight against the sheet. Do not over-drive fasteners. Prevent wrinkles from forming in the sheet as the fasteners are installed.

- At the end of the sheet where it terminates at roof edges, walls and penetrations, fasten the perimeter of the membrane with appropriate fasteners and seam plates to the deck or vertical surface at the base of the upstand.
- Clean laps as necessary before welding seams. Refer to [Section 1.2](#).
- Hot-air weld all laps. Do not puddle/tack weld membrane at side laps prior to using automatic welder.
- When rows of fasteners are installed through the membrane at perimeter and corner enhancements, weld a minimum 8 in wide sealing strip over the fasteners.


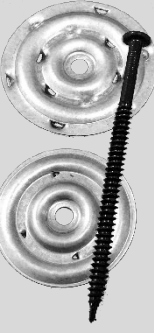

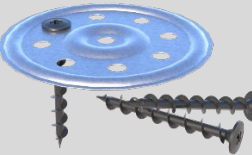
*Inspection:*

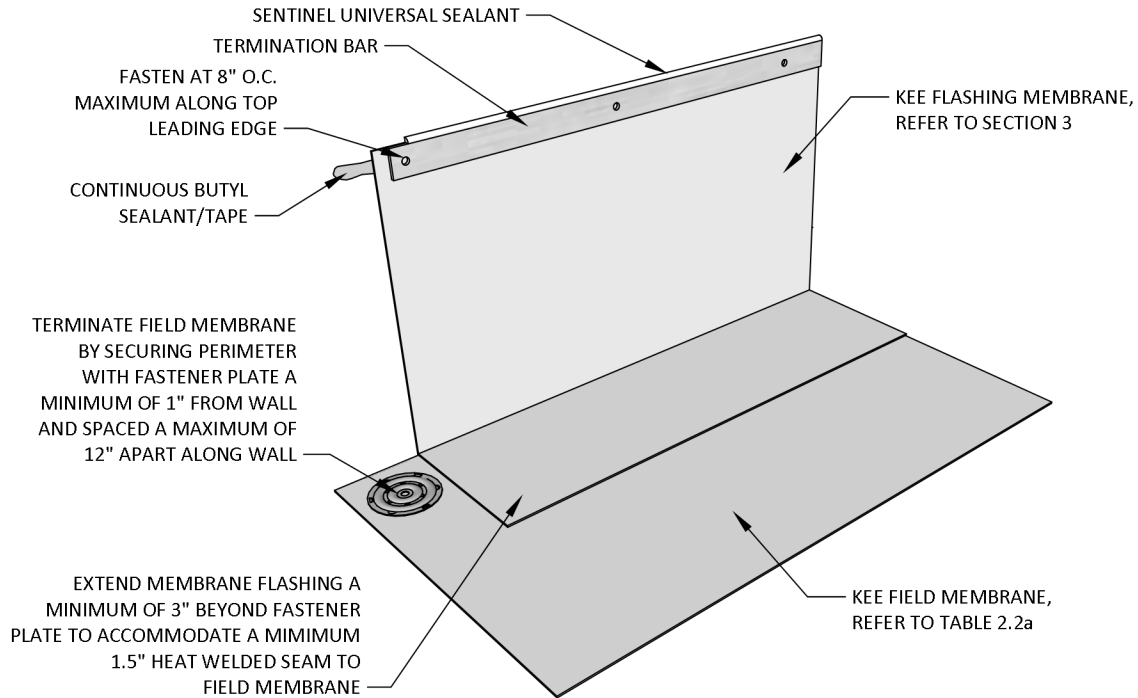
- Carefully probe all seams using a rounded-tip probe such as a cotter pin puller. Prevent damage to the membrane during inspection.
- Inspect all t-joints to ensure all t-joints have t-joint patches.
- Repair all open seams and damage found during inspection.
- When seam weld quality is suspect, inspect laps using destructive examination methods.
  - Cut 2 in wide weld samples across the seam 6 in on either side of the weld (2 in x 12 in wide strip).
  - Cut a minimum of three (3) sample welds in each suspect area.
  - Peel the test strips apart at the welds.
  - A satisfactory weld is achieved when the KEE consistently and uniformly delaminates from the reinforcing fabric.
- Inspect the membrane each day to ensure the membrane is properly fastened to the substrate.
- Each day, repair all voids, wrinkles, open and damaged laps, and all other deficiencies before proceeding.
- Temporary night seals are required to seal membrane terminations watertight. Remove all temporary night seals before resuming the installation.
- Ensure the membrane is sealed watertight each day.

**Table 2.2a Mechanically Fastened KEE Field Membranes**

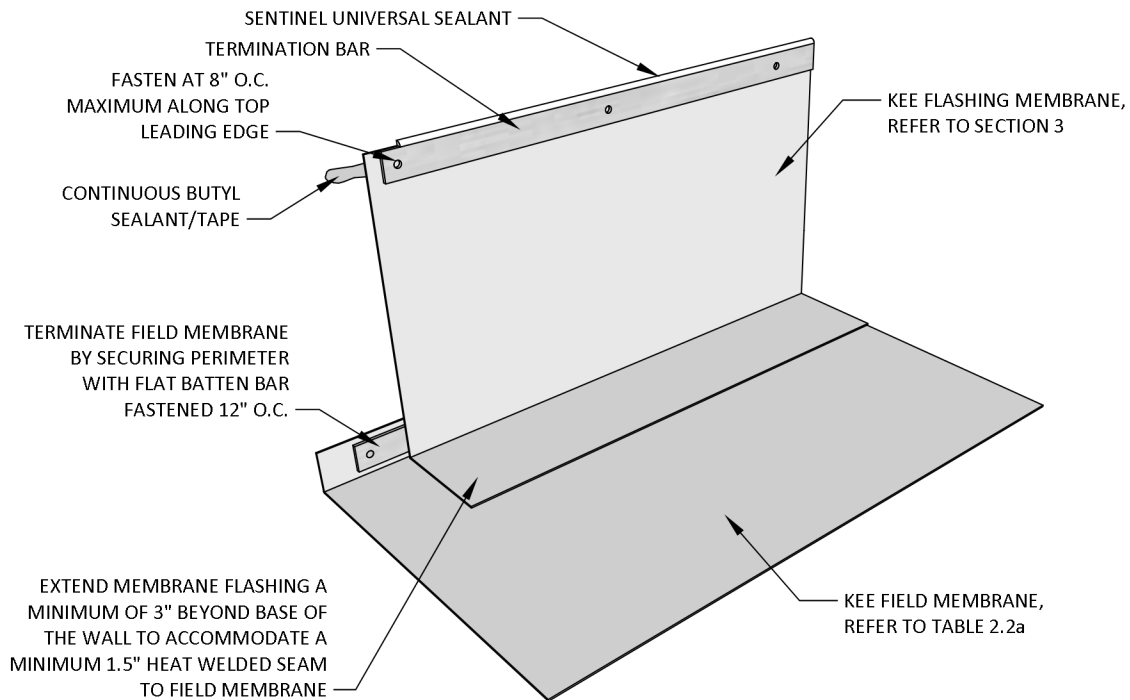
Membrane	Thickness	Reinforcement	Backing
<a href="#">SENTINEL® KEE P150</a>	60 mils	Polyester	Bare
<a href="#">SENTINEL® KEE P200</a>	80 mils	Polyester	Bare
<a href="#">SENTINEL® KEE P150 HFB</a>	60 mils	Polyester	Fleece
<a href="#">SENTINEL® KEE P200 HFB</a>	80 mils	Polyester	Fleece

**Table 2.2b Mechanically Fastened KEE Field Membrane Fasteners**

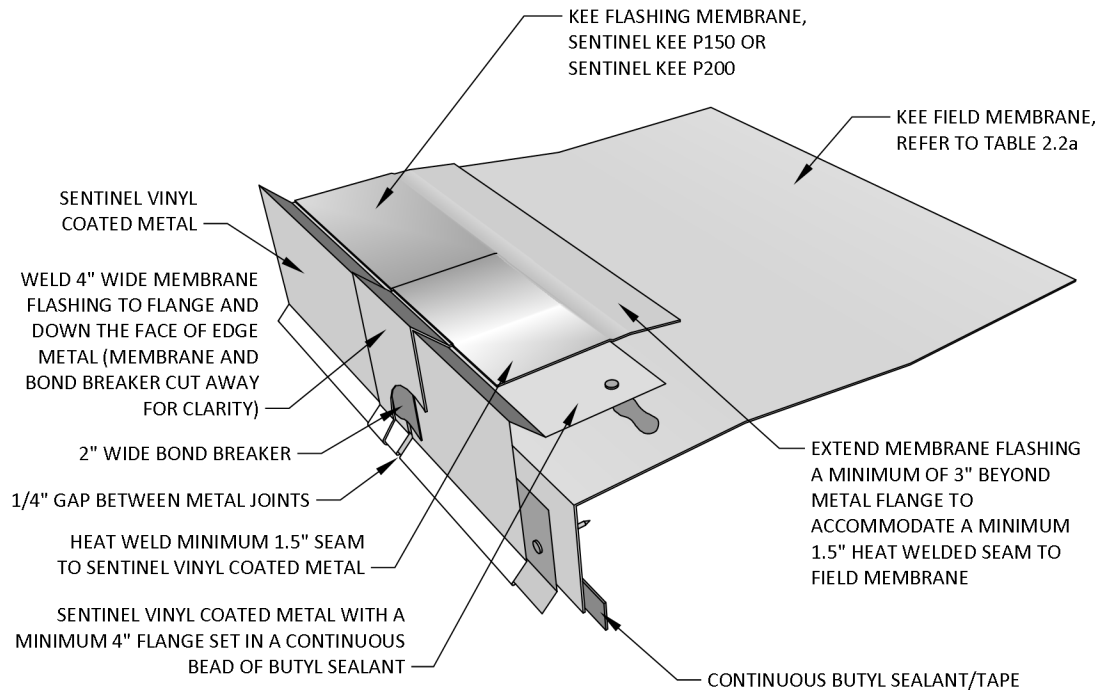
Name	Graphic	KEE Membrane	Substrate/Deck Type
<a href="#">SOPRAPHIX® #14 MP FASTENER</a> with <a href="#">SOPRAPHIX® 2 IN STRESS PLATE</a> ,  <a href="#">SOPRAPHIX® #14 MP FASTENER</a> with <a href="#">SOPRAPHIX® 2.4 IN STRESS PLATE</a>		<a href="#">SENTINEL® KEE P150</a> ,  <a href="#">SENTINEL® KEE P200</a> ,  <a href="#">SENTINEL® KEE P150 HFB</a> ,  <a href="#">SENTINEL® KEE P200 HFB</a>	Steel,  Wood,  Concrete
<a href="#">SOPRAPHIX® #15 HD FASTENER</a> with <a href="#">SOPRAPHIX® 2 IN STRESS PLATE</a> ,  <a href="#">SOPRAPHIX® #15 HD FASTENER</a> with <a href="#">SOPRAPHIX® 2.4 IN STRESS PLATE</a>		<a href="#">SENTINEL® KEE P150</a> ,  <a href="#">SENTINEL® KEE P200</a> ,  <a href="#">SENTINEL® KEE P150 HFB</a> ,  <a href="#">SENTINEL® KEE P200 HFB</a>	Steel,  Wood
<a href="#">CONCRETE SPIKE</a> with <a href="#">SOPRAPHIX® 2 IN STRESS PLATE</a> ,  <a href="#">CONCRETE SPIKE</a> with <a href="#">SOPRAPHIX® 2.4 IN STRESS PLATE</a>		<a href="#">SENTINEL® KEE P150</a> ,  <a href="#">SENTINEL® KEE P200</a> ,  <a href="#">SENTINEL® KEE P150 HFB</a> ,  <a href="#">SENTINEL® KEE P200 HFB</a>	Concrete
<a href="#">VERSA-FAST® FASTENER</a> With <a href="#">VERSA-FAST® PLATE</a>		<a href="#">SENTINEL® KEE P150</a> ,  <a href="#">SENTINEL® KEE P200</a> ,  <a href="#">SENTINEL® KEE P150 HFB</a> ,  <a href="#">SENTINEL® KEE P200 HFB</a>	Cellular lightweight insulating concrete,  Aggregate lightweight insulating concrete,  Poured gypsum



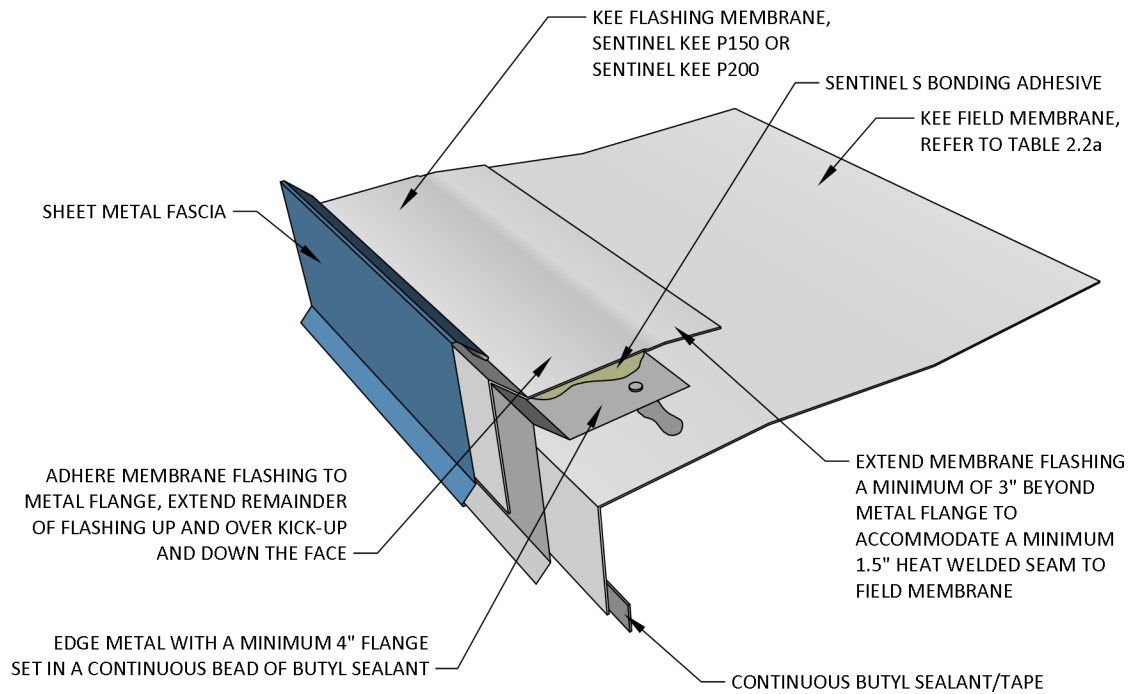
*Figure 2.2a Mechanically Fastened KEE Field Membrane at Wall/Curb with Horizontal Perimeter Fastening*



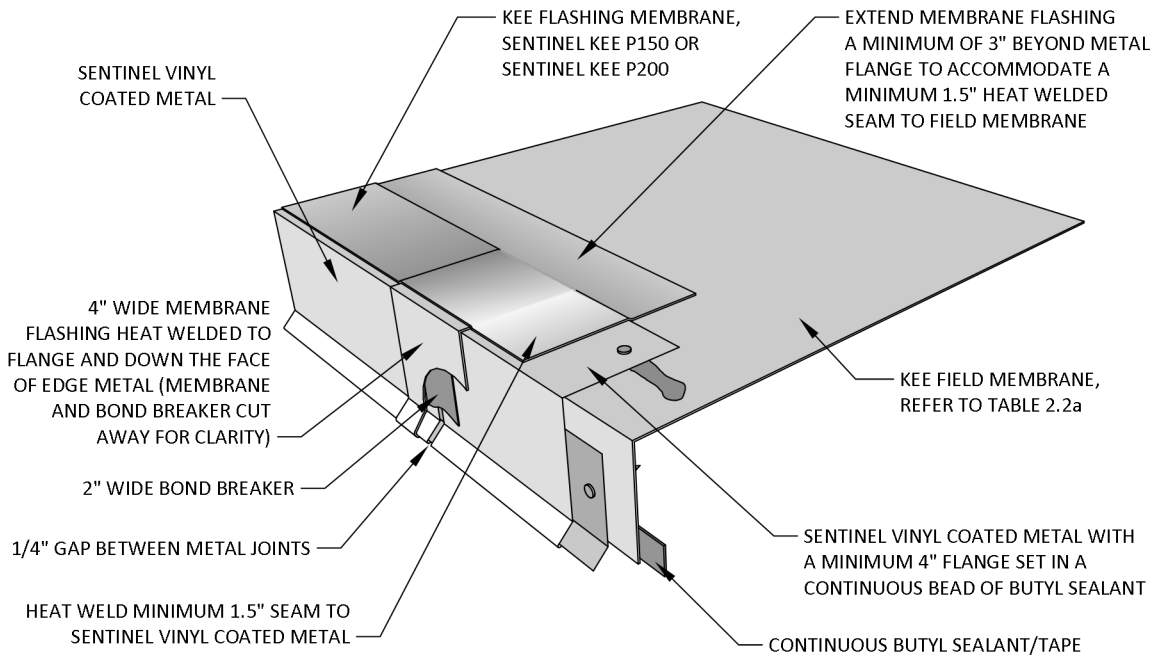
*Figure 2.2b Mechanically Fastened KEE Field Membrane at Wall/Curb with Vertical Perimeter Fastening*



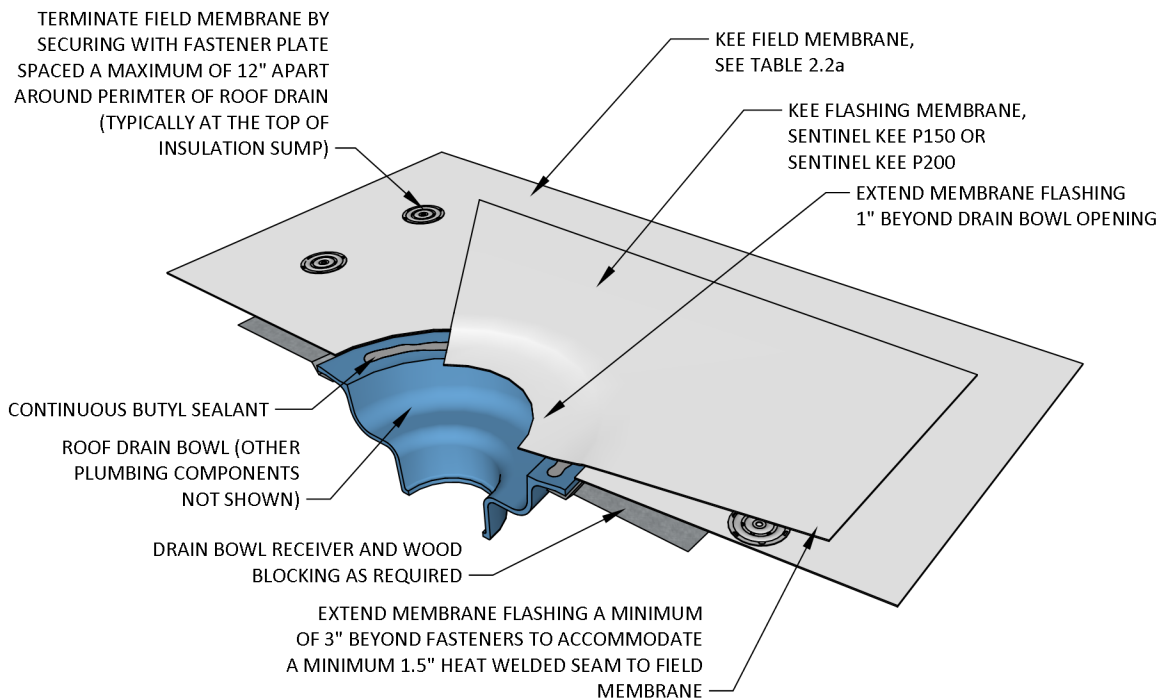
*Figure 2.2c Mechanically Fastened KEE Field Membrane at Gravel Stop with Vinyl Coated Metal Fascia*



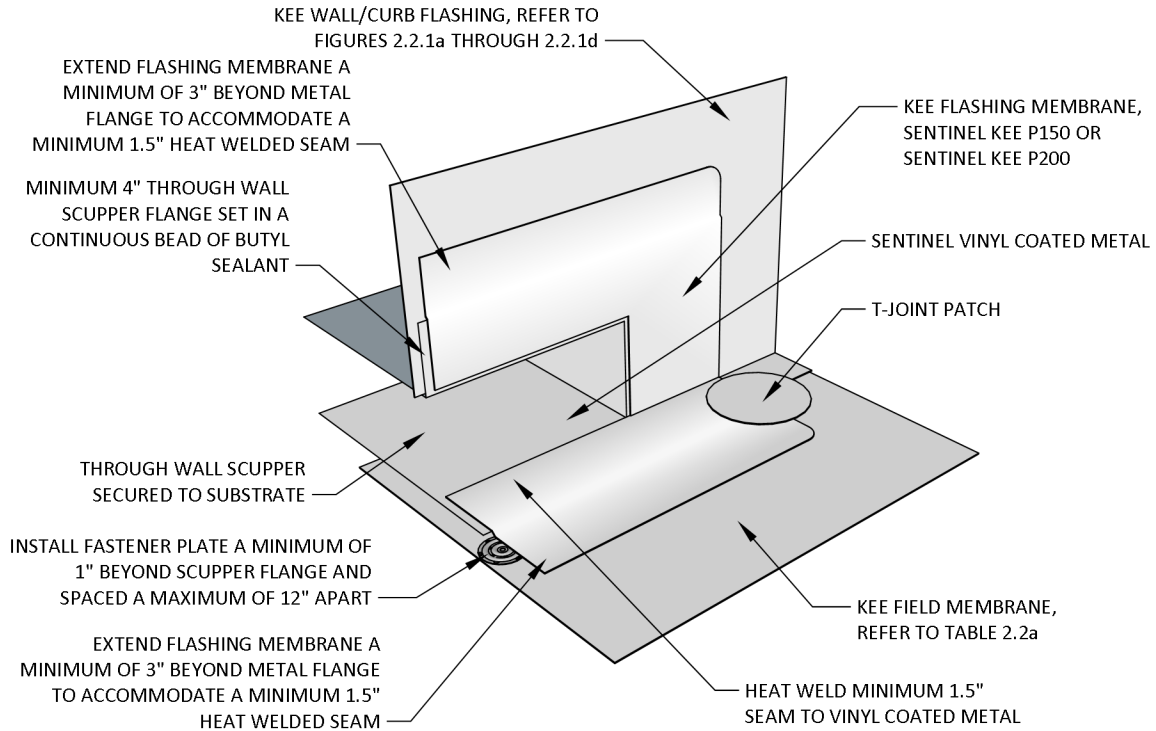
*Figure 2.2d Mechanically Fastened KEE Field Membrane at Gravel Stop with Sheet Metal Fascia*



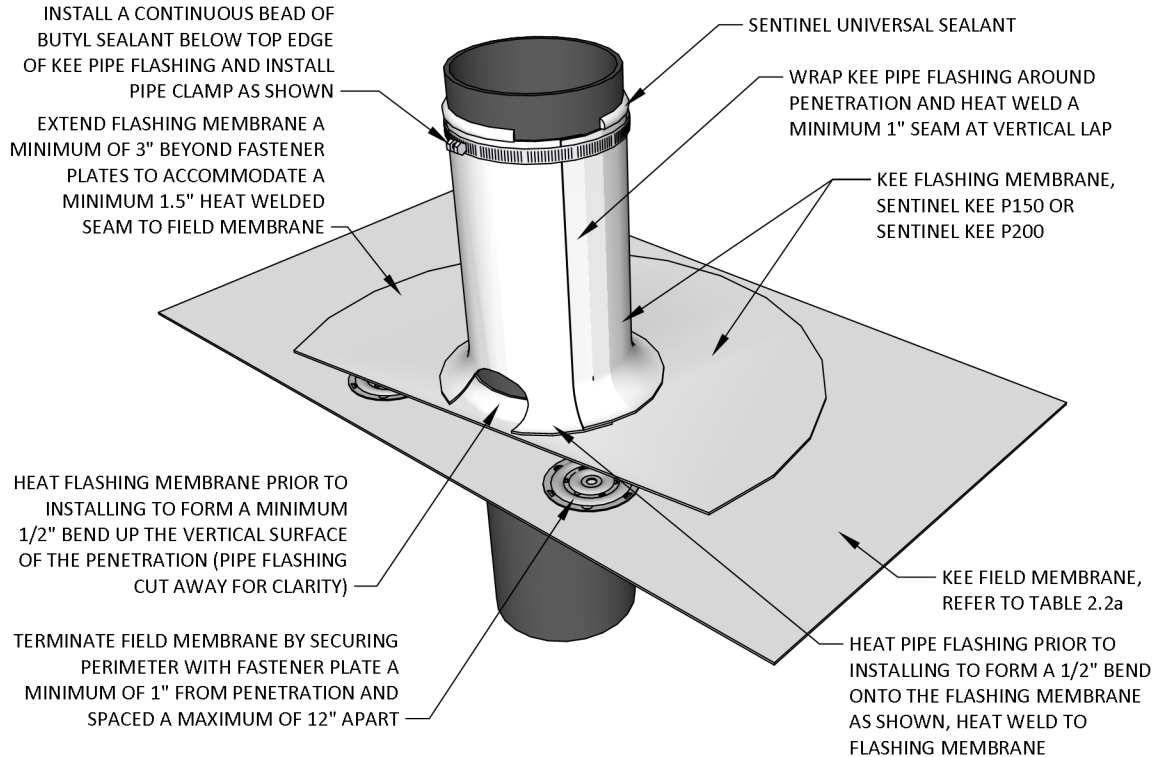
*Figure 2.2e Mechanically Fastened KEE Field Membrane at Drip Edge*



*Figure 2.2f Mechanically Fastened KEE Field Membrane at Roof Drain*

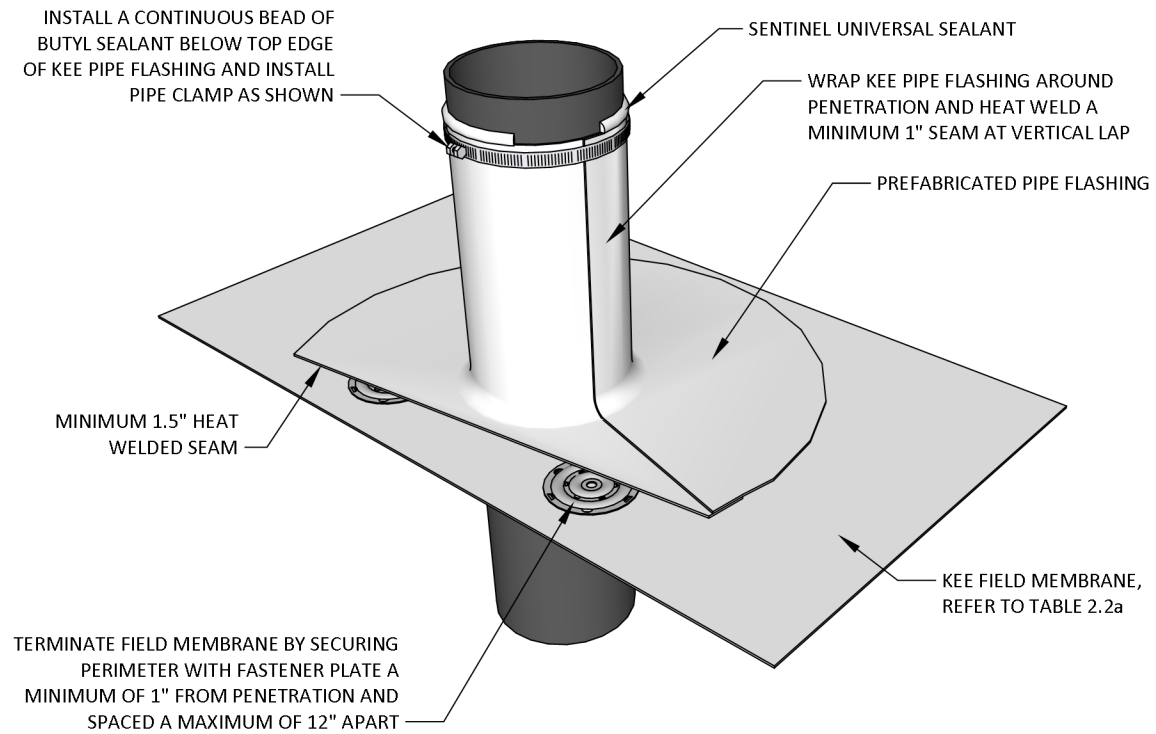


*Figure 2.2g Mechanically Fastened KEE Field Membrane at Through Wall Scupper*



*Figure 2.2h Mechanically Fastened KEE Field Membrane at Penetration With Field Fabricated Pipe Flashing*





*Figure 2.2i Mechanically Fastened KEE Field Membrane at Penetration With Prefabricated Pipe Flashing*

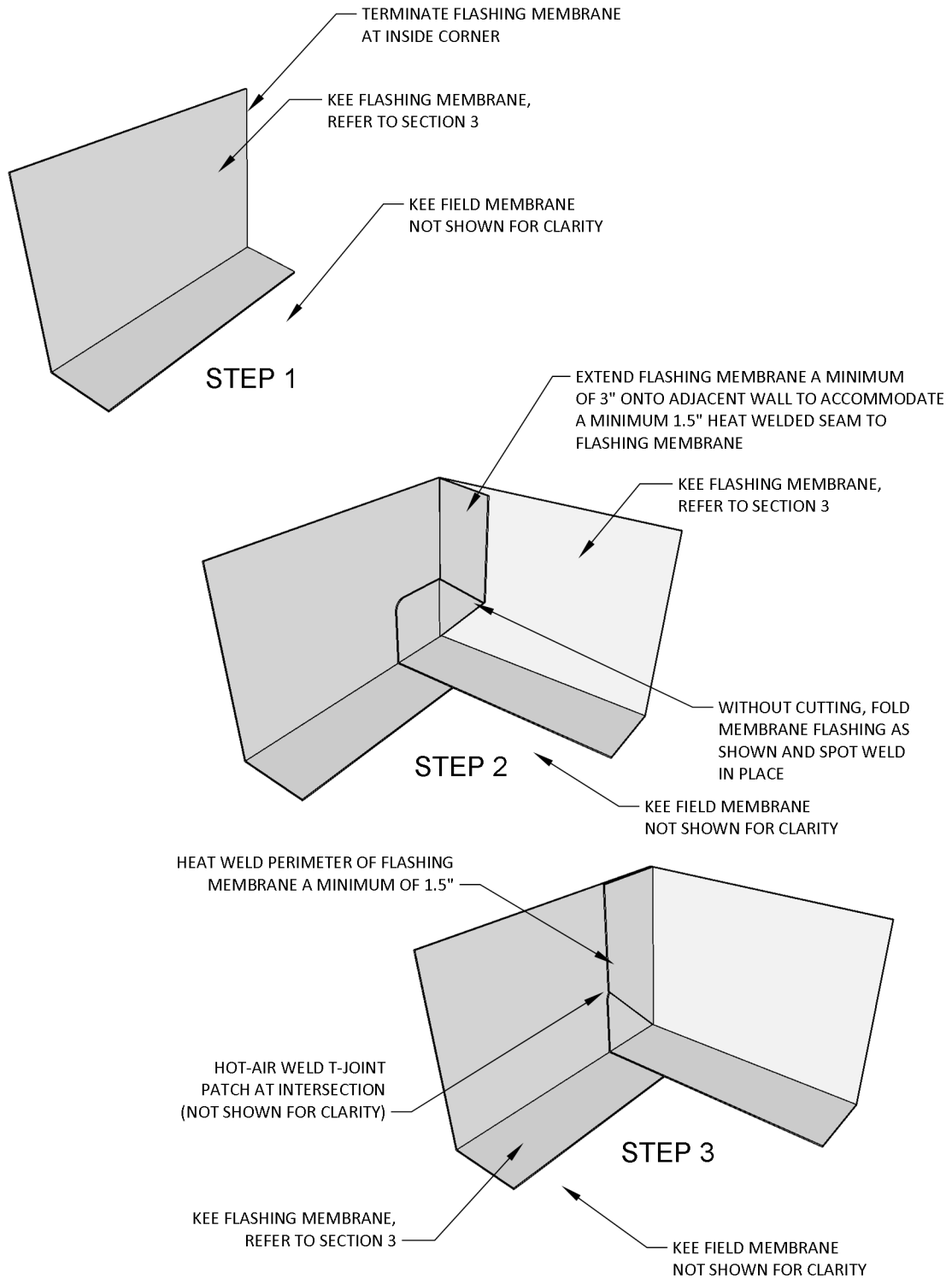
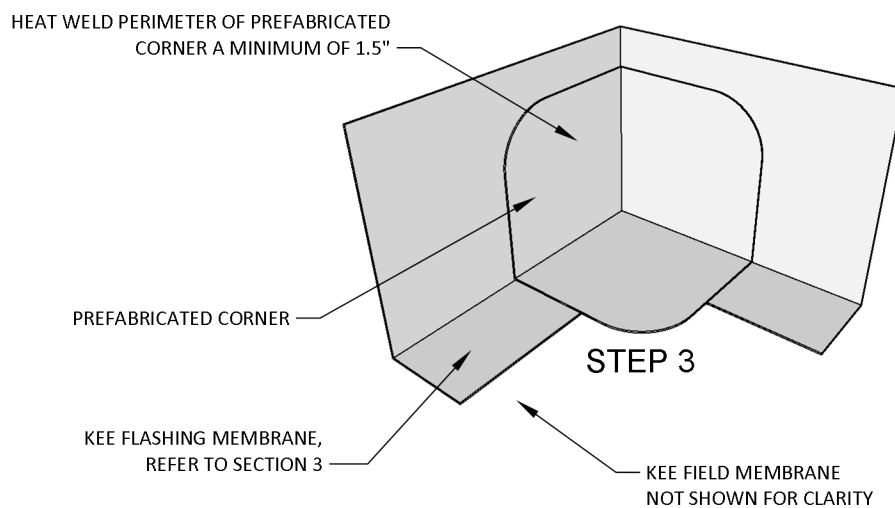
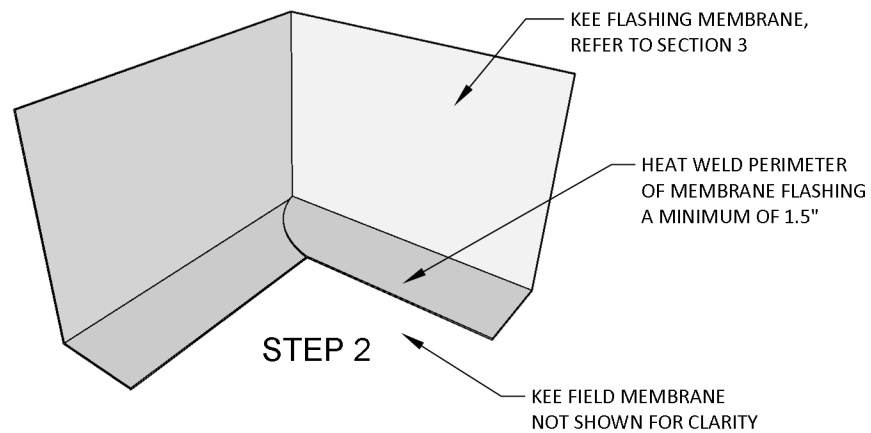
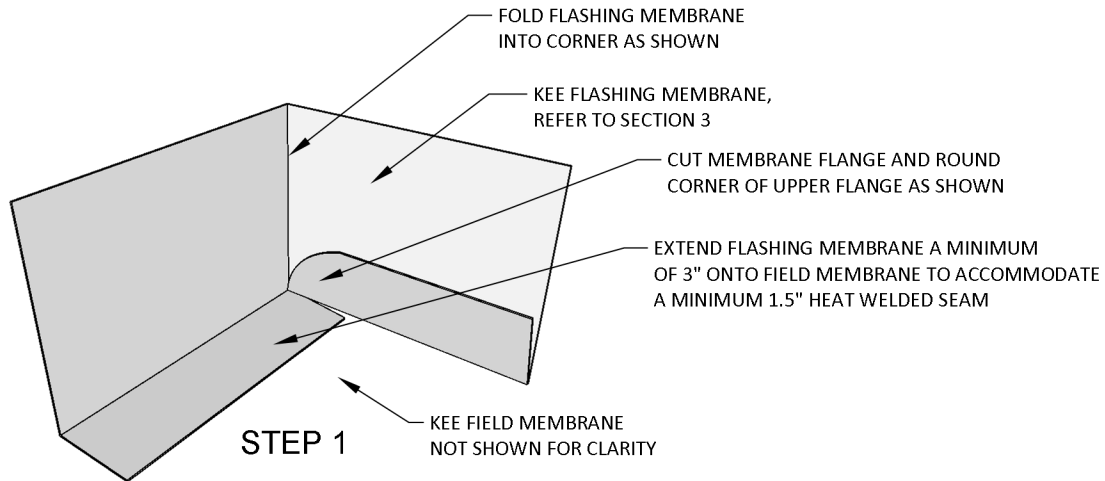
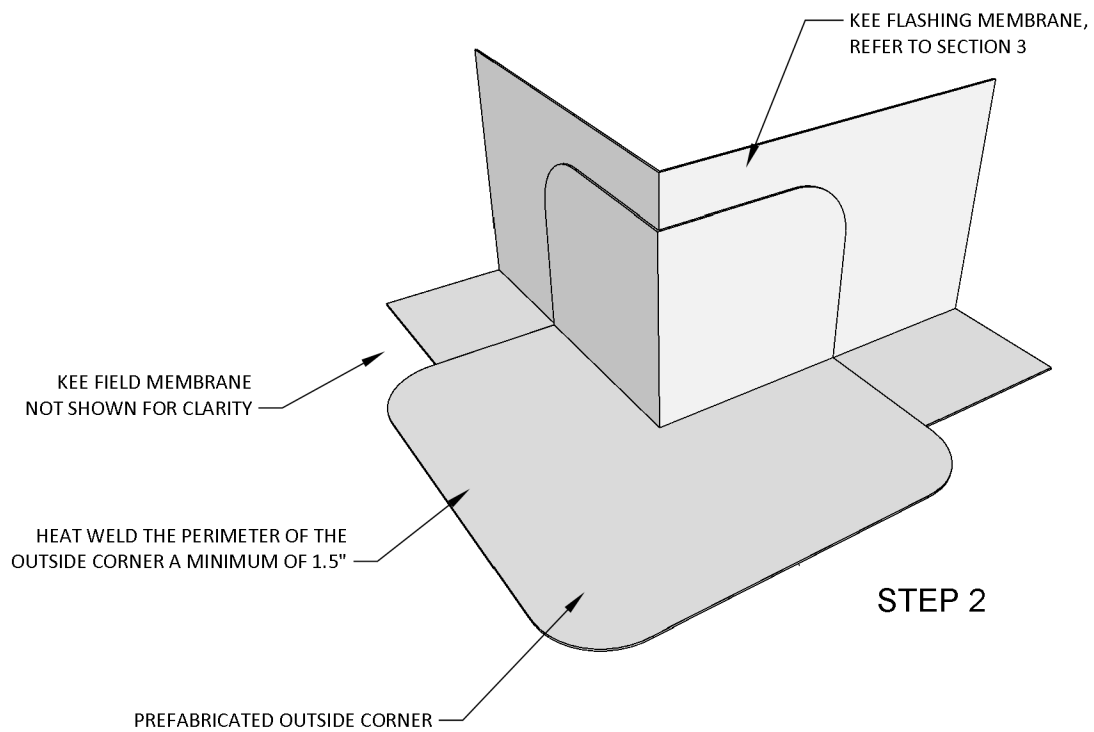
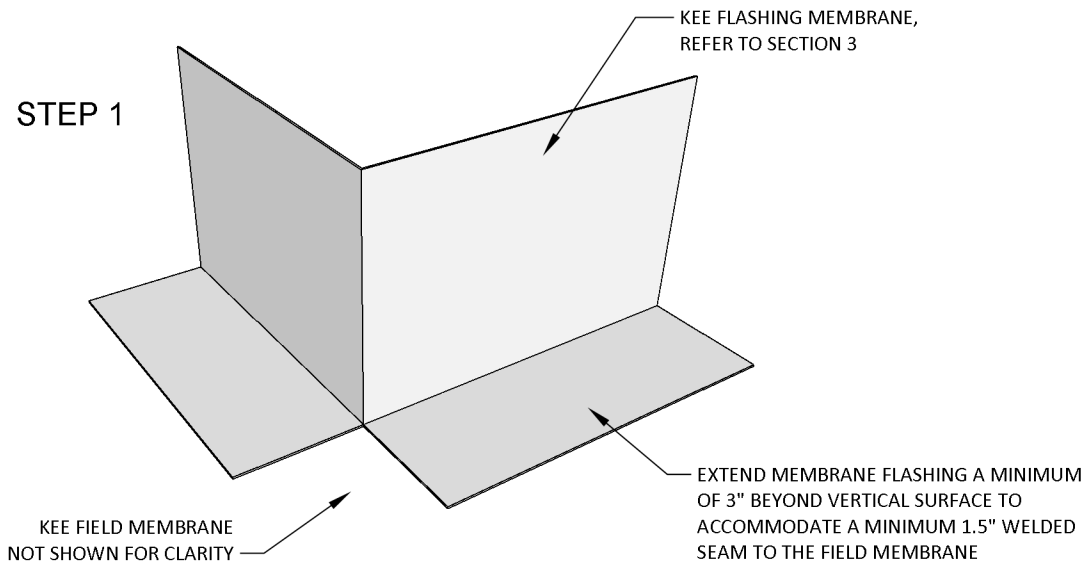


Figure 2.2j Mechanically Fastened KEE Field Membrane with Field Fabricated Flashing at Inside Corner



*Figure 2.2k Mechanically Fastened KEE Field Membrane with Prefabricated Flashing at Inside Corner*



*Figure 2.2I Mechanically Fastened KEE Field Membrane with Prefabricated Flashing at Outside Corner*

## 2.3 INDUCTION WELDED KEE FIELD MEMBRANES

### *General:*

- SENTINEL® KEE field membranes may be induction welded to fastener stress plates for new roof and recover applications. For adhered field membranes, refer to [Section 2.1](#). for mechanically fastened field membranes, refer to [Section 2.2](#).
- Induction welded SENTINEL® KEE field membranes are polyester reinforced, 60 or 80 mils thick, and are bare on the underside. Refer to [Table 2.3a](#).
- The induction welding tool, fasteners and 3 in induction welding stress plates must be approved together for use with the specified SENTINEL® KEE membrane. Refer to [Table 2.3b](#).
- The fasteners and stress plates are secured to approved roof decks.
- The SENTINEL® KEE field membrane is unrolled over the stress plates and induction welded to the stress plates.
- Refer to the fastener manufacturer's installation instructions and induction welding tool operating instructions.
- The contractor and/or applicator is responsible for managing and controlling all exposures related to chemical hazards, toxic substances and odors. This includes personal protective equipment (PPE), administrative and work practice controls, and engineering controls. The contractor is responsible for the elimination or substitution of products as necessary to manage and control exposures related to chemical hazards, toxic substances and odors.
- 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.
- Refer to safety data sheets and product data sheets for additional information.

### *Preparation:*

- Ensure the KEE membrane substrate surface has been properly prepared and is clean, dry and free of incompatible materials and debris.
- Examine all roof decks, wall substrates, nailers and other conditions at membrane terminations, transitions and penetrations.
- Ensure the roof deck and all other substrate conditions are acceptable to install the appropriate fasteners.
- Unroll the KEE membrane and allow it to relax.
- Roof recover:
  - Ensure existing roofing systems have been thoroughly evaluated and are determined to be structurally sound, dry and meet all applicable requirements for induction welded recover systems.
  - Ensure existing substrates will accommodate the recover system to provide positive slope for adequate roof drainage.
  - Remove all existing incompatible materials or separate incompatible materials from direct contact with bare KEE. Refer to [Section 1.1](#) or contact [SOPREMA®](#) for additional information.
  - KEE induction welded above approved polystyrene requires an SFSintec 3.5 in diameter FI-Pad disc located between the polystyrene and the 3 in induction welding stress plates to prevent melting the polystyrene. Contact [SOPREMA®](#) for additional information or other approved separation layers.
  - Refer to insulation and cover board installation guidelines for compatible insulation and recover boards, and attachment requirements to existing roofing.
- Test induction welding equipment by welding a sample of KEE to stress plates to ensure settings are satisfactory. Allow the plate to cool, then attempt to pull the KEE from the plate. A satisfactory weld is achieved when the KEE consistently and uniformly delaminates from the reinforcing fabric, leaving residual KEE bonded to the plate.

*Application:*







- Install fasteners and stress plates as required for wind uplift requirements. Refer to [Figures 2.3a through 2.3i](#).
- During the same day, induction weld the KEE to all plates that have been installed to prevent condensation from forming on plates overnight.
- Avoid locating membrane side and end laps over the stress plates. Where multiple layers of membrane occur, refer to the induction welding tool operating instructions to adjust settings.
- Ensure the side and end laps are a minimum of 3 in to accommodate minimum 1-1/2 in welded lap seams. Refer to [Section 5.1](#).
- Clean side and end laps as necessary before welding seams. Refer to [Section 1.2](#).
- Remove all membrane wrinkles.
- Hot-air weld all laps. Refer to [Section 4.1](#).
- Ensure the induction welding plates and bottom surface of the KEE membrane are dry and free of condensation before beginning induction welding.
- Locate each stress plate beneath the KEE membrane. Center the induction welder over each plate and activate the induction welding tool. Do not move the induction welder during the induction welding cycle.
- Once the weld is complete, immediately place a specialized magnet directly over each plate. Allow the magnets to remain in place until the plates have cooled.
- Where induction welds are suspect, examine the membrane attachment using a suction plate or plunger.
- At the end of the sheet where it terminates at roof edges, walls and penetrations, fasten the perimeter of the membrane with appropriate fasteners and seam plates to the deck or vertical surface at the base of the upstand.

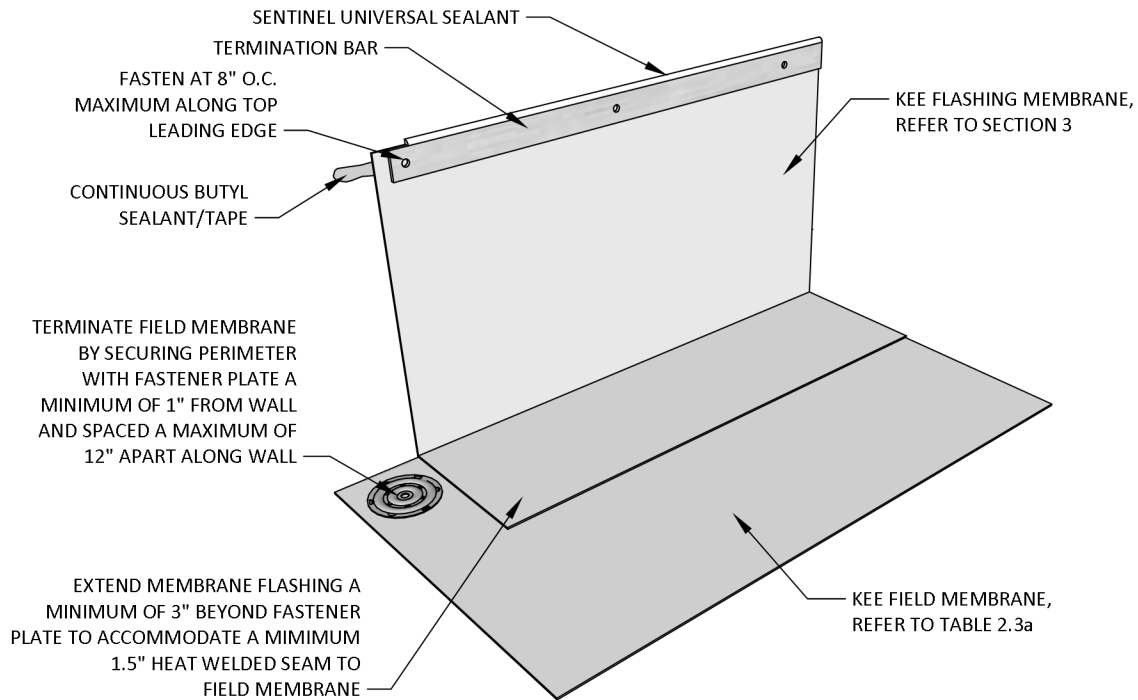
*Inspection:*

- Carefully probe all seams using a rounded-tip probe such as a cotter pin puller. Prevent damage to the membrane during inspection.
- Inspect all t-joints to ensure all t-joints have t-joint patches.
- Repair all open seams and damage found during inspection.
- When seam weld quality is suspect, inspect laps using destructive examination methods.
  - Cut 2 in wide weld samples across the seam 6 in on either side of the weld (2 in x 12 in wide strip).
  - Cut a minimum of three (3) sample welds in each suspect area.
  - Peel the test strips apart at the welds.
  - A satisfactory weld is achieved when the KEE consistently and uniformly delaminates from the reinforcing fabric.
- Inspect the membrane each day to ensure the membrane is properly fastened to the substrate.
- Each day, repair all voids, wrinkles, open and damaged laps, and all other deficiencies before proceeding.
- Temporary night seals are required to seal membrane terminations watertight. Remove all temporary night seals before resuming the installation.
- Ensure the membrane is sealed watertight each day.

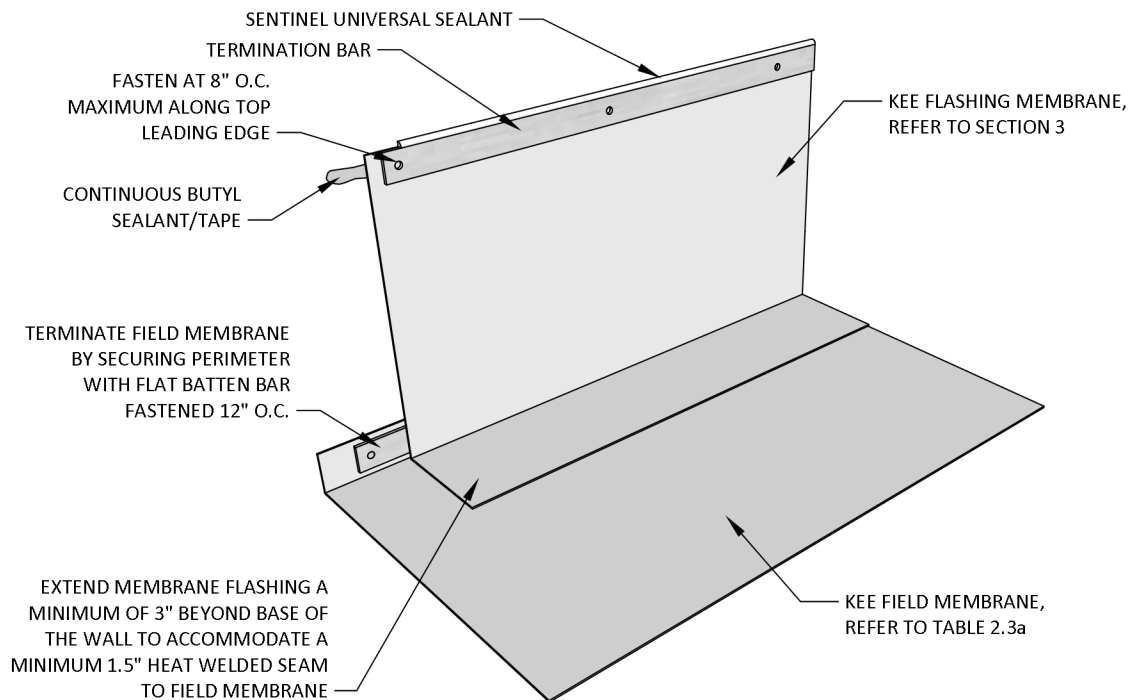
Table 2.3a Induction Welded KEE Field Membranes			
Membrane	Thickness	Reinforcement	Backing
<a href="#">SENTINEL® KEE P150</a>	60 mils	Polyester	Bare
<a href="#">SENTINEL® KEE P200</a>	80 mils	Polyester	Bare

**Table 2.3b Induction Welded KEE Field Membrane Fasteners**

Name	Graphic	KEE Membrane	Substrate/Deck Type
<a href="#">SOPRAFIX® #12 DP FASTENER</a> with SFS® isoweld Plate		<a href="#">SENTINEL® KEE P150,</a>  <a href="#">SENTINEL® KEE P200</a>	Steel,  Wood
<a href="#">SOPRAFIX® #12 DP FASTENER</a> with SENTINEL® Induction Weld Plate or Trufast IW Plate			
<a href="#">SOPRAFIX® #14 MP FASTENER</a> with SFS® isoweld Plate		<a href="#">SENTINEL® KEE P150,</a>  <a href="#">SENTINEL® KEE P200</a>	Steel,  Wood,  Concrete
<a href="#">SOPRAFIX® #14 MP FASTENER</a> with SENTINEL® Induction Weld Plate or Trufast IW Plate			
<a href="#">SOPRAFIX® #15 HD FASTENER</a> with SFS® isoweld Plate		<a href="#">SENTINEL® KEE P150,</a>  <a href="#">SENTINEL® KEE P200</a>	Steel,  Wood
<a href="#">SOPRAFIX® #15 HD FASTENER</a> with SENTINEL® Induction Weld Plate or Trufast IW Plate			

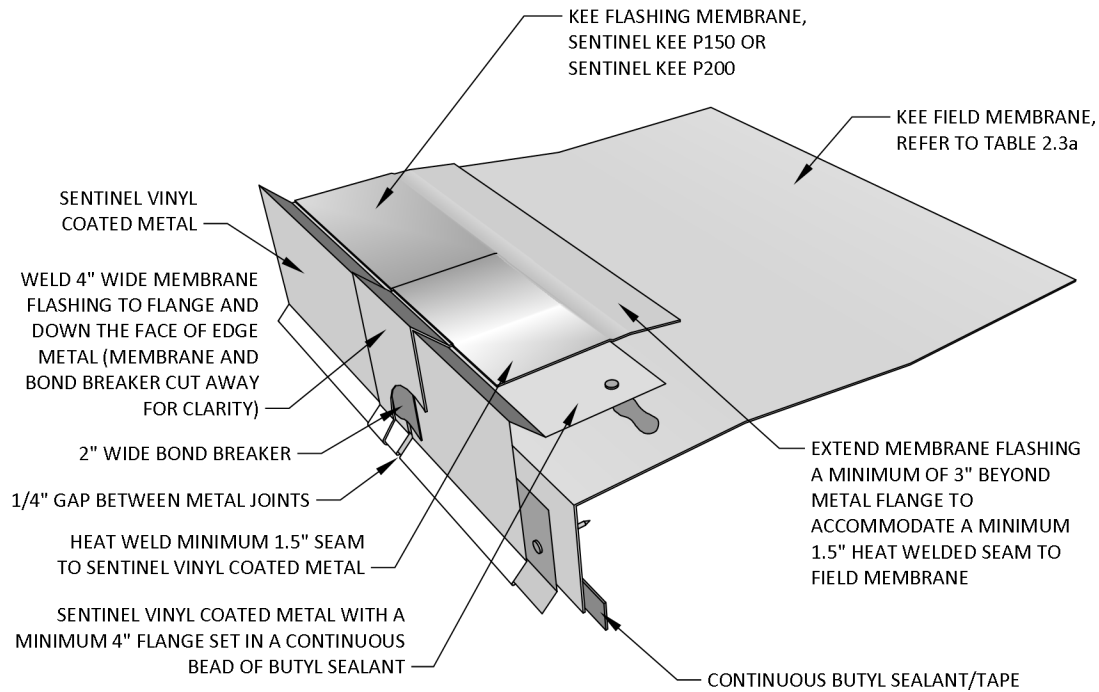


*Figure 2.3a Induction Welded KEE Field Membrane with Adhered Flashing Membrane at Wall/Curb and Horizontal Perimeter Fastening*

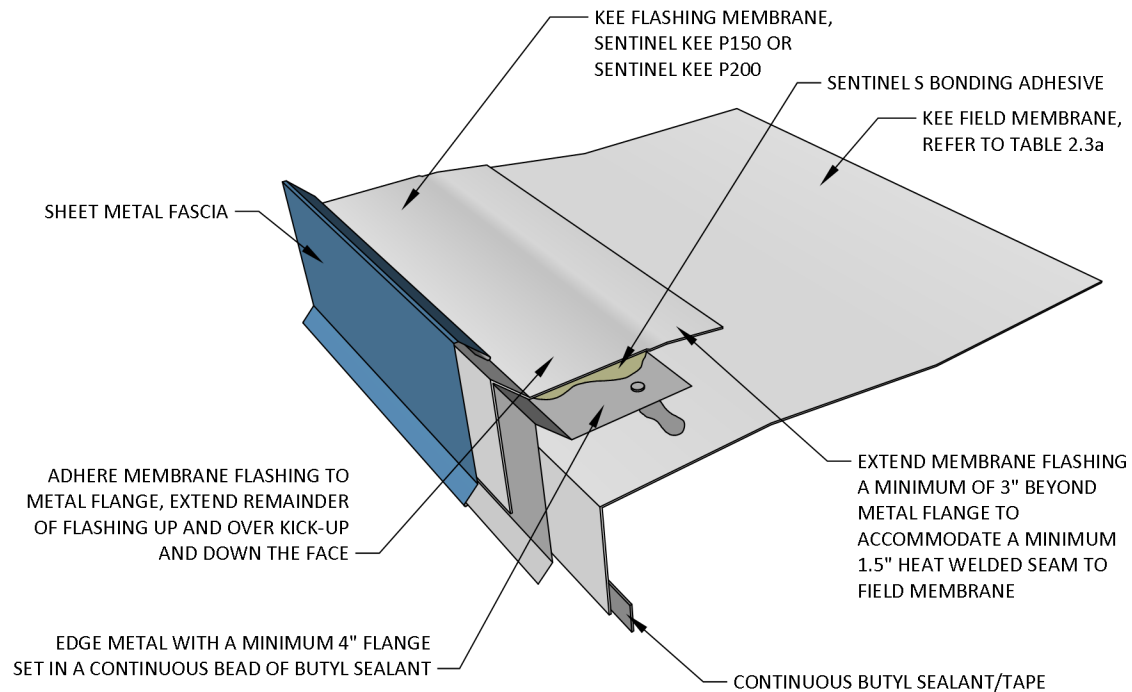


*Figure 2.3b Induction Welded KEE Field Membrane with Adhered Flashing Membrane at Wall/Curb and Vertical Perimeter Fastening*

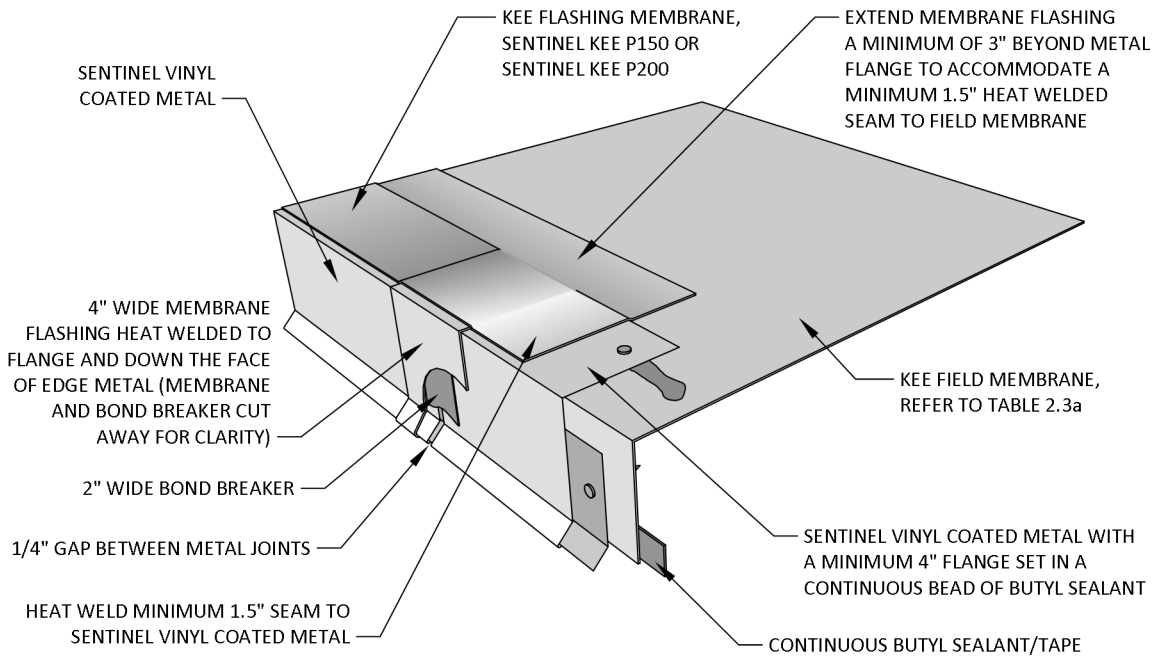




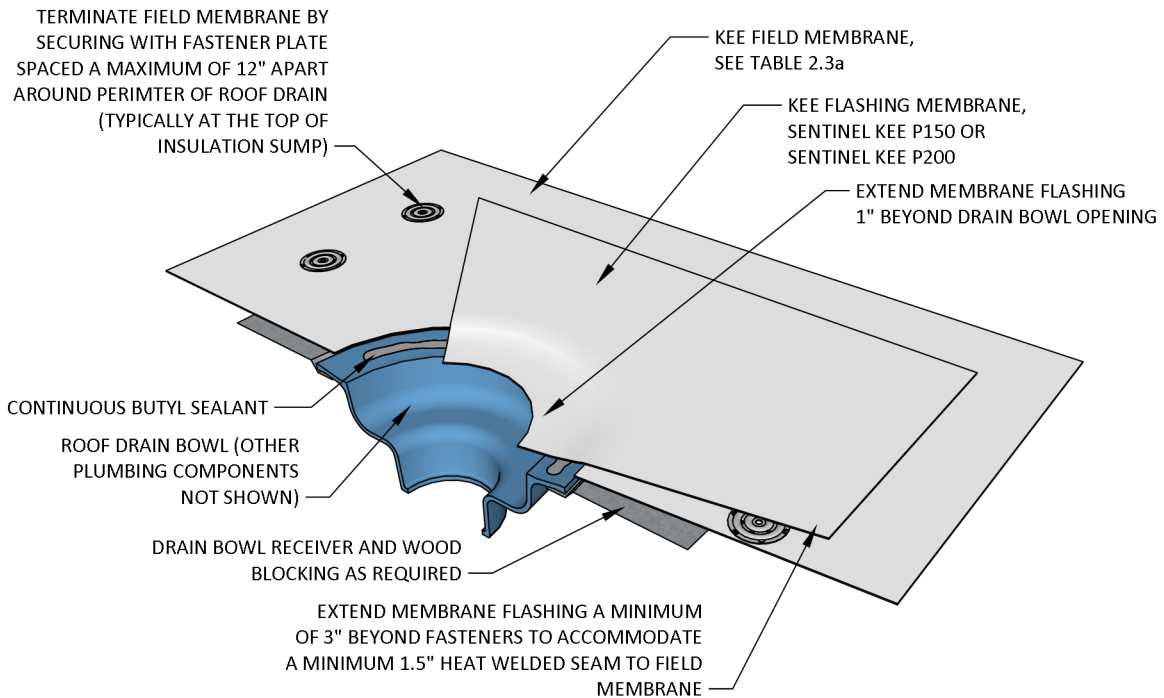
*Figure 2.3c Induction Welded KEE Field Membrane at Gravel Stop With Vinyl Coated Metal Fascia*



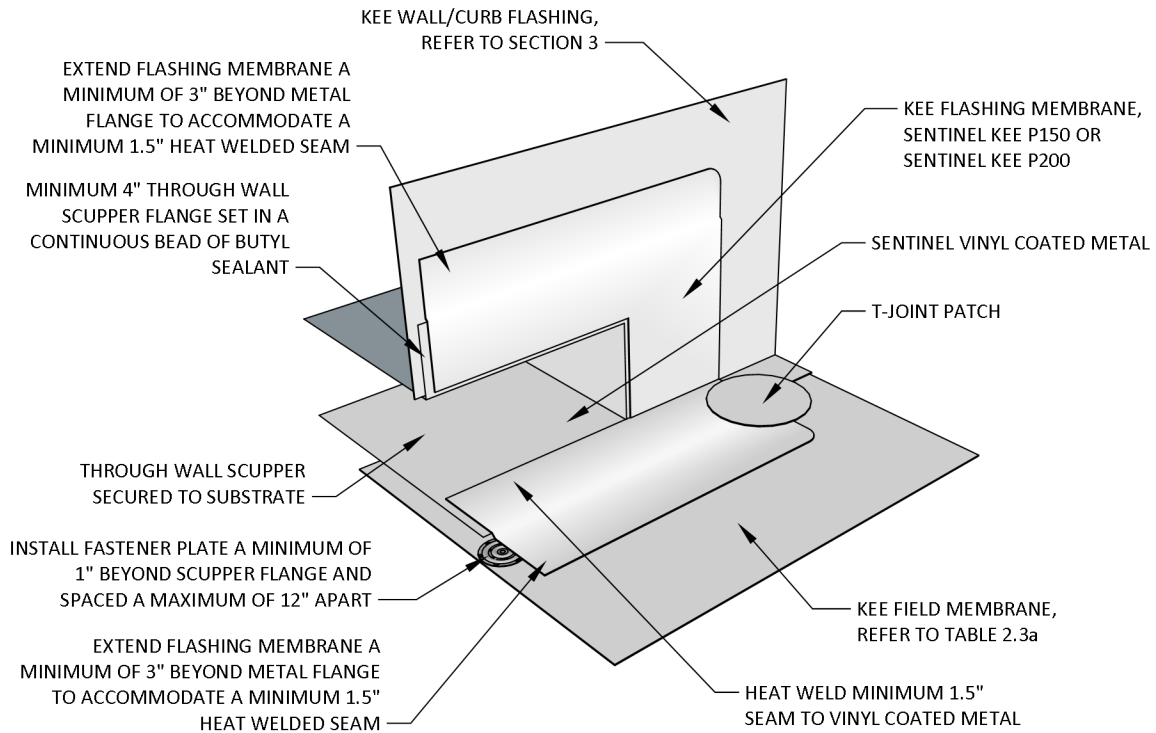
*Figure 2.3d Induction Welded KEE Field Membrane at Gravel Stop With Sheet Metal Fascia*



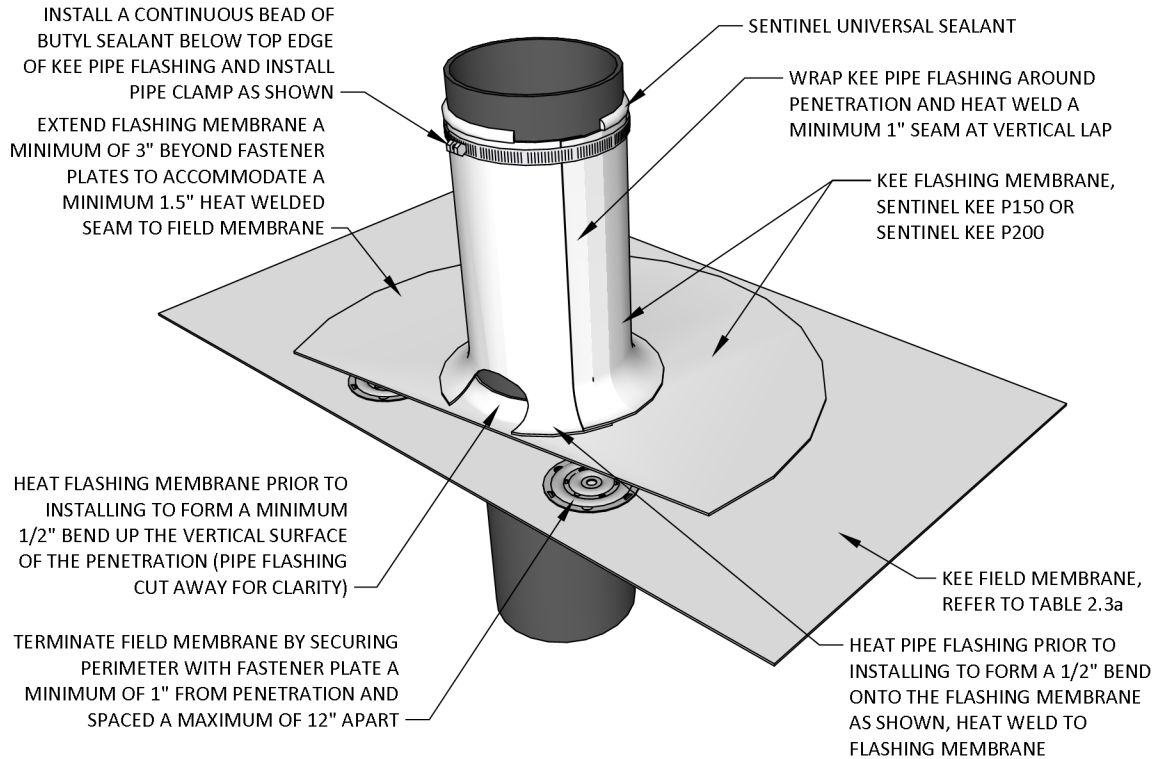
*Figure 2.3e Induction Welded KEE Field Membrane at Drip Edge*



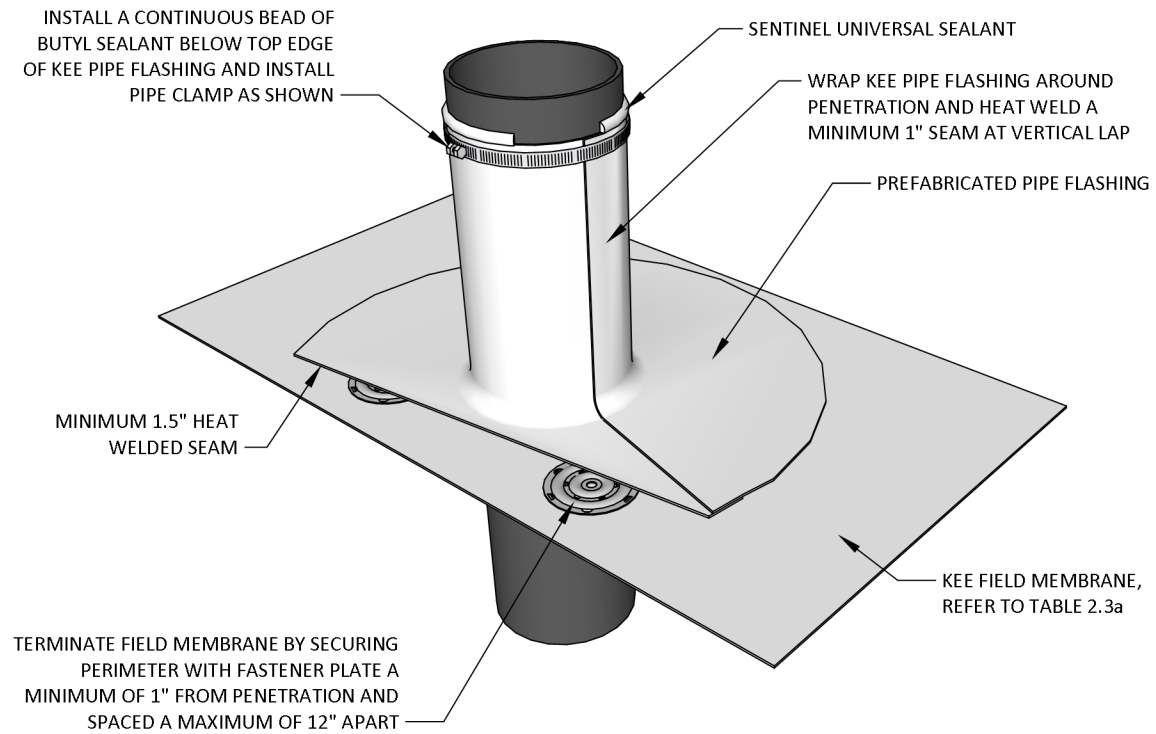
*Figure 2.3f Induction Welded KEE Field Membrane at Roof Drain*



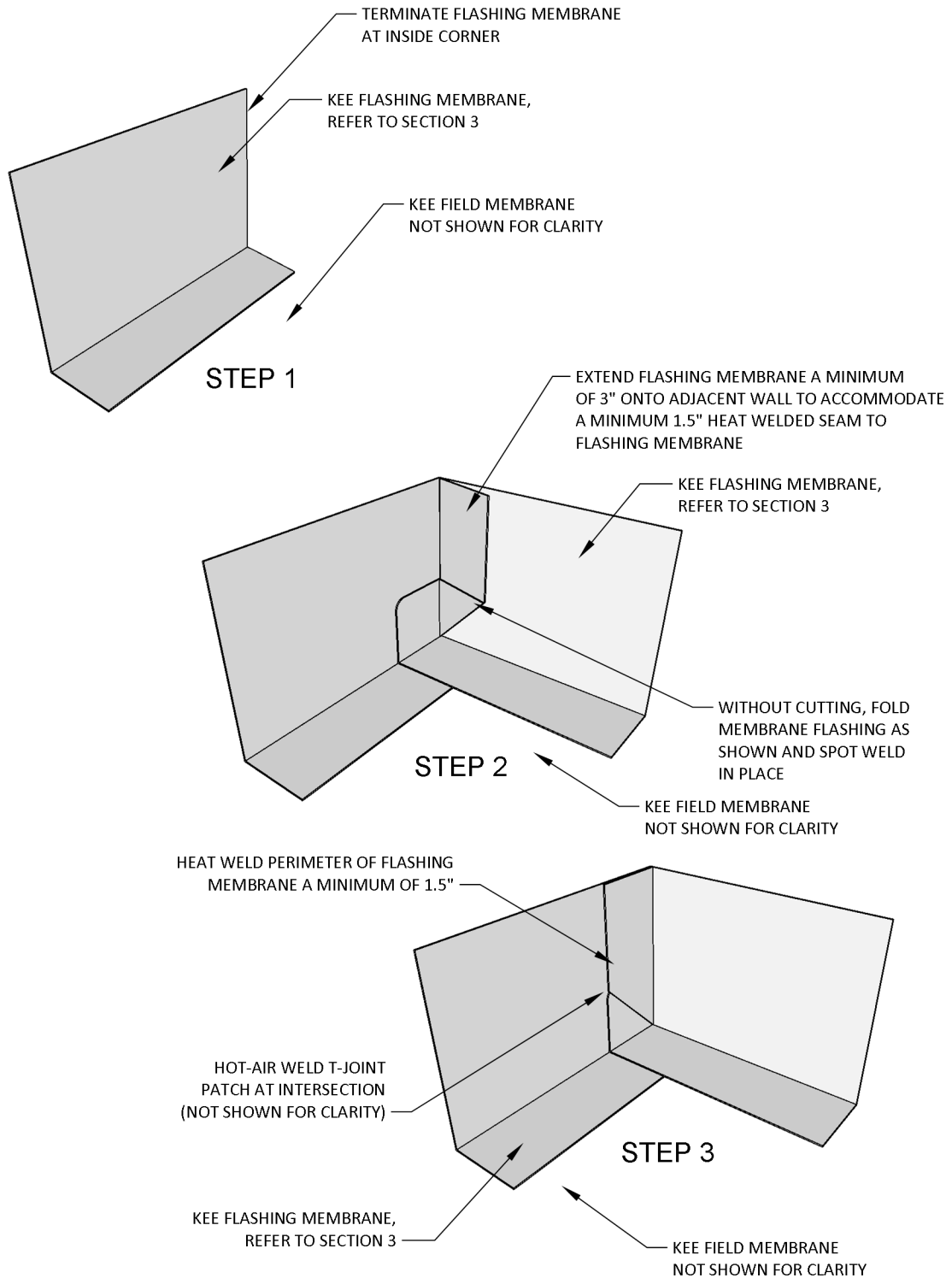
*Figure 2.3g Induction Welded KEE Field Membrane at Through Wall Scupper*



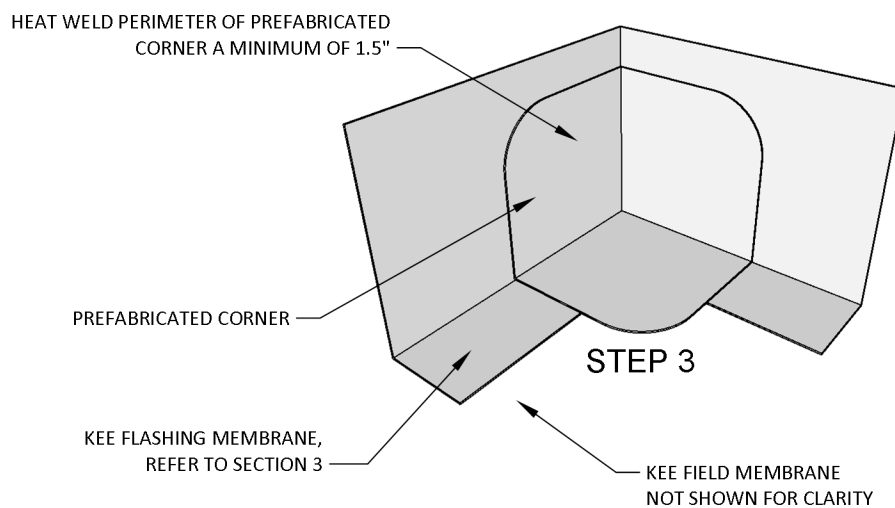
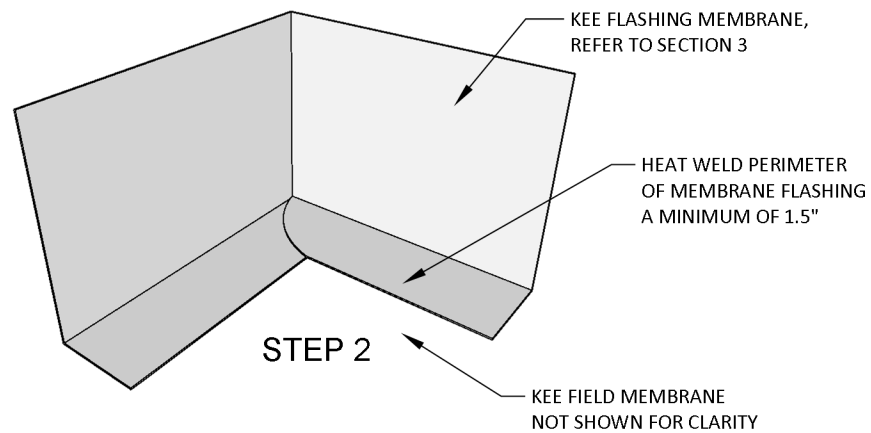
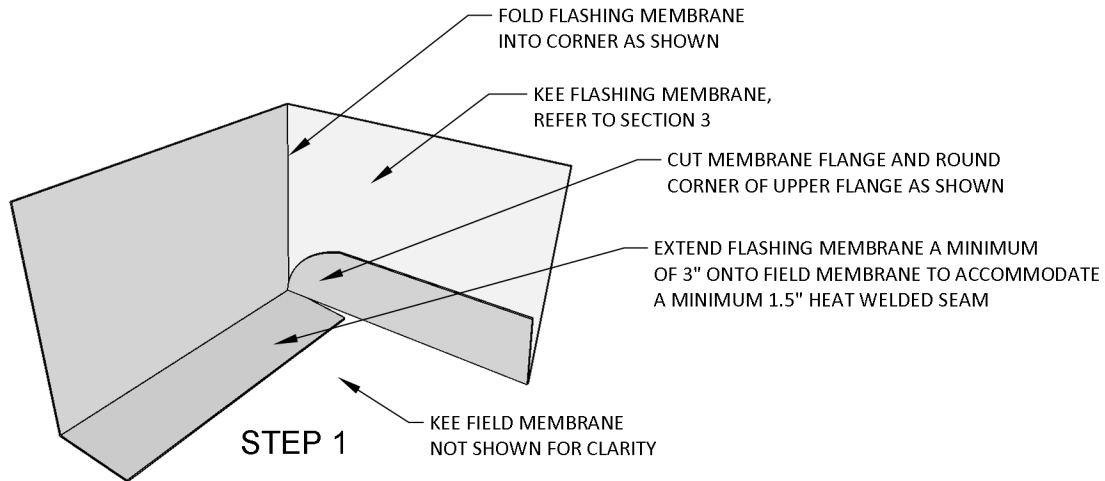
*Figure 2.3h Induction Welded KEE Field Membrane at Penetration With Field Fabricated Pipe Flashing*



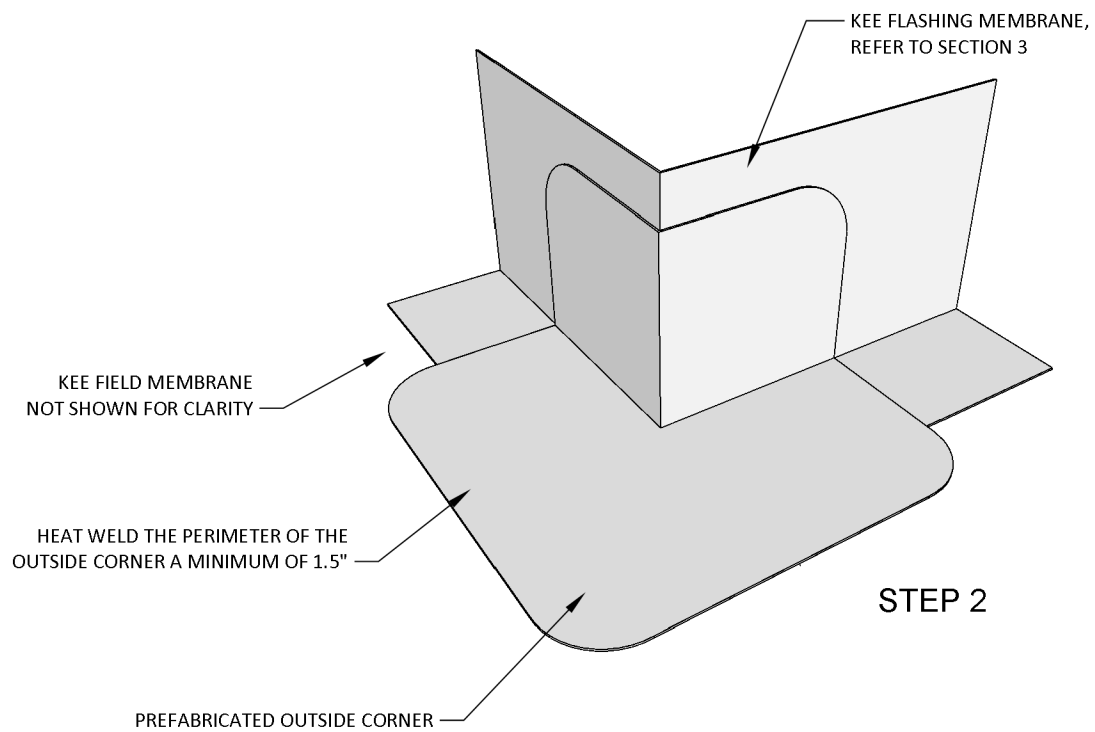
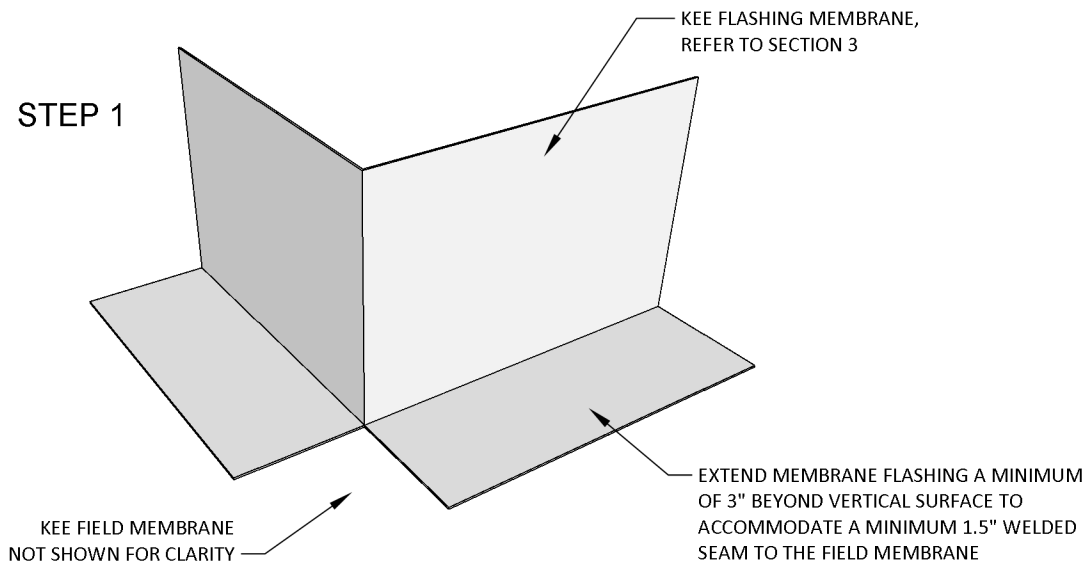
*Figure 2.3i Induction Welded KEE Field Membrane at Penetration With Prefabricated Pipe Flashing*



*Figure 2.3j Induction Welded KEE Field Membrane with Field Fabricated Flashing at Inside Corner*



*Figure 2.3k Induction Welded KEE Field Membrane with Prefabricated Flashing at Inside Corner*



*Figure 2.3I Induction Welded KEE Field Membrane with Prefabricated Flashing at Outside Corner*

## 3 FLASHING MEMBRANES

### 3.1 ADHERED KEE FLASHING MEMBRANES

#### *General:*

- SENTINEL® KEE flashing membranes may be adhered for new and roof recover applications. For induction welded flashing membranes, refer to [Section 3.2](#).
- Adhered SENTINEL® KEE flashing membranes are polyester reinforced, 60 or 80 mils thick, and are bare on the underside. Refer to [Table 3.1a](#).
- KEE flashing membranes are adhered to approved substrates using [SENTINEL® S BONDING ADHESIVE](#). Refer to [Table 3.1b](#).
- The contractor and/or applicator is responsible for managing and controlling all exposures related to chemical hazards, toxic substances and odors. This includes personal protective equipment (PPE), administrative and work practice controls, and engineering controls. The contractor is responsible for the elimination or substitution of products as necessary to manage and control exposures related to chemical hazards, toxic substances and odors.
- 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.
- Refer to safety data sheets and product data sheets for additional information.

#### *Preparation:*

- Ensure flashing substrates are clean, dry, smooth and free of asphalt, coatings and other incompatible materials and debris.
- Ensure environmental conditions are acceptable to proceed. Monitor precipitation, temperature, humidity, dew point temperature, wind, cloud cover and sun that may have an effect on materials and application.
- The ambient temperature should be above 40°F (4°C) and rising during application. During extended periods of cold weather, KEE materials should be stored in a warm, heated storage area for optimum performance.
- Conditions should remain dry, and the ambient temperature should be well above the dew point at all times during roofing application.
- Before beginning application, unroll the KEE flashing membrane and allow it to relax.
- Roof recover flashing:
  - Ensure existing flashing substrates have been thoroughly evaluated and are determined to be structurally sound, dry and meet all applicable requirements for roof recover.
  - Remove or otherwise prepare existing flashings or coatings to ensure the surface is smooth and will provide a satisfactory substrate for new SENTINEL® KEE flashing.
  - Remove all existing incompatible materials or separate incompatible materials from direct contact with bare KEE. Refer to [Section 1.1](#) or contact [SOPREMA®](#) for additional information.
  - Where existing bitumen products and coating cannot be completely removed, install new gypsum or cement roof boards, or other acceptable wall sheathing, to provide a new substrate for KEE flashing.

#### *Application:*

- Flashing application using [SENTINEL® S BONDING ADHESIVE](#):
  - For use with bare KEE only.
  - Use a minimum 3/8 in nap, solvent resistant roller or brush to apply adhesive. Dip the roller into the adhesive to fully coat the roller.



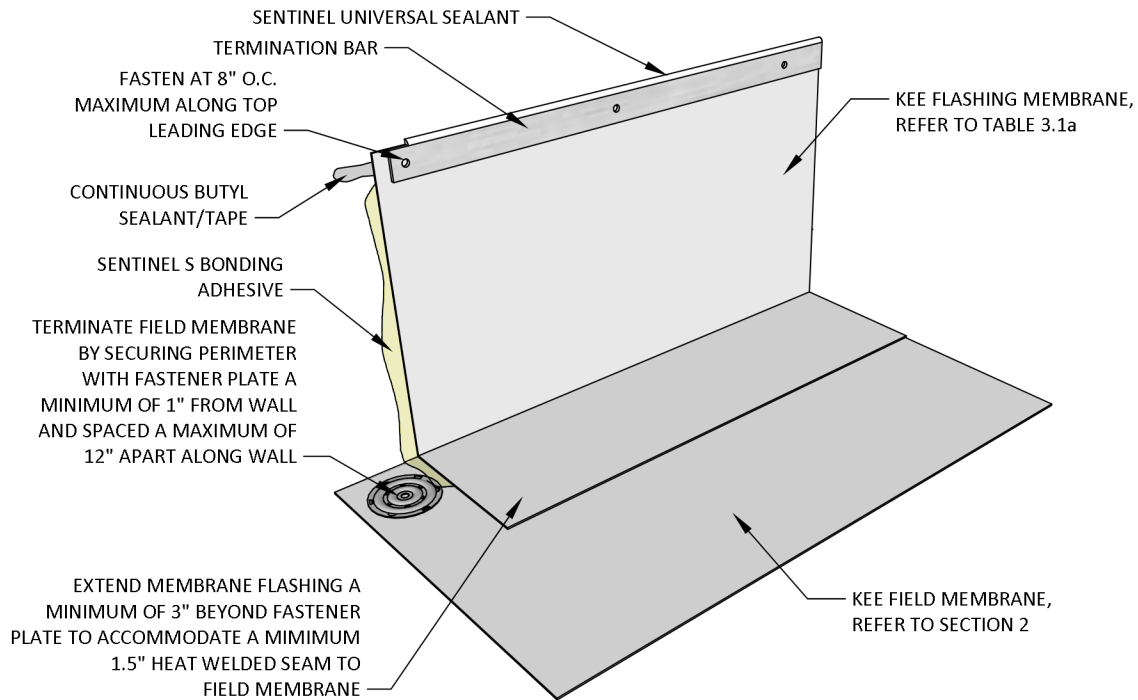
- Evenly apply adhesive to clean, dry and prepared substrate while applying adhesive to the back of the bare KEE membrane.
- Prevent adhesive from contaminating the KEE lap seams to be welded.
- Apply uniform adhesive coverage as indicated on product data sheet. Adjust the application rate based on environmental conditions, substrate roughness and porosity.
- Allow the adhesive on both surfaces to become tacky but not wet. The adhesive should not transfer to the finger or string when touched.
- Prevent dust and debris from contaminating adhesive.
- During humid weather, and during periods when the temperature is near the dew point temperature, examine surfaces closely for condensation.
- Do not install if condensation forms on the adhesive surface. During humid conditions condensation may form on the adhesive surface due to evaporative cooling that occurs when the solvent evaporates.
- Mate the membrane to the substrate for adhesive-to-adhesive contact.
- Apply pressure using a hand-held roller to ensure complete adhesion and prevent wrinkles and air bubbles.
- Install butyl water cutoff, fasten and seal the leading edge of horizontal and vertical flashings at all terminations. Refer to [Figures 3.1a through 3.1b](#).
- Clean laps as necessary before welding. Refer to [Section 1.2](#).
- Hot-air weld all flashing laps. Refer to [Section 5.1](#).

*Inspection:*

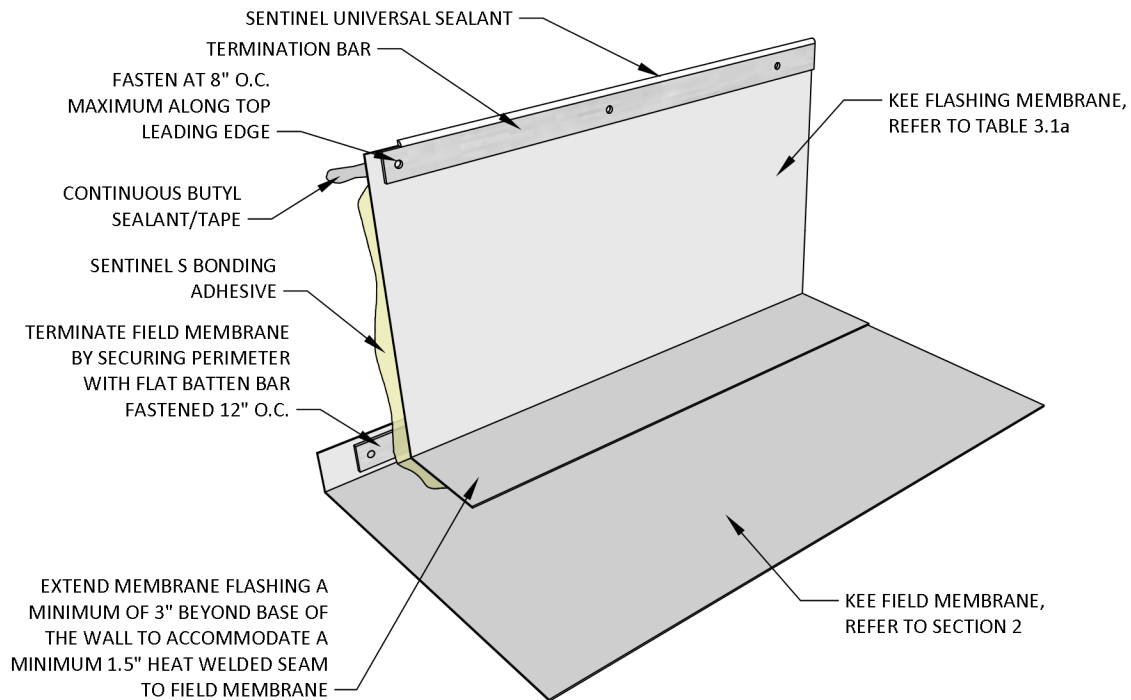
- Carefully probe all seams using a rounded-tip probe such as a cotter pin puller. Prevent damage to the membrane during inspection.
- Inspect all t-joints to ensure all t-joints have t-joint patches.
- Repair all open seams and damage found during inspection.
- When seam weld quality is suspect, inspect laps using destructive examination methods.
  - Cut 2 in wide weld samples across the seam 6 in on either side of the weld (2 in x 12 in wide strip).
  - Cut a minimum of three (3) sample welds in each suspect area.
  - Peel the test strips apart at the welds.
  - A satisfactory weld is achieved when the KEE breaks, or consistently and uniformly delaminates from the reinforcing fabric.
- Inspect the flashings each day to ensure the flashings are adhered to the substrate.
- Each day, repair all un-adhered voids, wrinkles, open and damaged laps, and all other deficiencies before proceeding.
- Temporary night seals are required to seal terminations watertight. Remove all temporary night seals before resuming the installation.
- Ensure the flashings are sealed watertight each day.

Table 3.1a Adhered KEE Flashing Membranes			
Membrane	Thickness	Reinforcement	Backing
<a href="#">SENTINEL® KEE P150</a>	60 mils	Polyester	Bare
<a href="#">SENTINEL® KEE P200</a>	80 mils	Polyester	Bare

<b>Table 3.1b Substrates for Adhered KEE Flashing Membranes</b>		
<b>Substrate</b>	<b>Adhesive</b>	<b>KEE Flashing Membrane</b>
Concrete	<a href="#">SENTINEL® S BONDING ADHESIVE</a>	All KEE flashing membranes. Refer to <a href="#">Table 3.1a</a> .
Approved gypsum roof boards	<a href="#">SENTINEL® S BONDING ADHESIVE</a>	All KEE flashing membranes. Refer to <a href="#">Table 3.1a</a> .
Approved cement roof boards	<a href="#">SENTINEL® S BONDING ADHESIVE</a>	All KEE flashing membranes. Refer to <a href="#">Table 3.1a</a> .
Wood	<a href="#">SENTINEL® S BONDING ADHESIVE</a>	All KEE flashing membranes. Refer to <a href="#">Table 3.1a</a> .
Masonry	<a href="#">SENTINEL® S BONDING ADHESIVE</a>	All KEE flashing membranes. Refer to <a href="#">Table 3.1a</a> .
Metal	<a href="#">SENTINEL® S BONDING ADHESIVE</a>	All KEE flashing membranes. Refer to <a href="#">Table 3.1a</a> .



*Figure 3.1a Adhered KEE Flashing Membrane at Wall/Curb with Horizontal Perimeter Fastening*



*Figure 3.1b Adhered KEE Flashing Membrane at Wall/Curb with Vertical Perimeter Fastening*

## 3.2 INDUCTION WELDED KEE FLASHING MEMBRANES

### General:

- SENTINEL® KEE flashing membranes may be induction welded to fastener stress plates for new roof and recover applications. For adhered flashing membranes, refer to [Section 3.1](#).
- Induction welded SENTINEL® KEE flashing membranes are polyester reinforced, 60 or 80 mils thick, and are bare on the underside. Refer to [Table 3.2a](#).
- The induction welding tool, fasteners and 3 in induction welding stress plates must be approved together for use with the specified SENTINEL® KEE membrane. Refer to [Table 3.2b](#).
- The fasteners and stress plates are secured to the flashing substrate, then the SENTINEL® KEE flashing membrane is applied over the 3 in stress plates and induction welded to the plates.
- Refer to the fastener manufacturer's installation instructions and induction welding tool operating instructions.
- The contractor and/or applicator is responsible for managing and controlling all exposures related to chemical hazards, toxic substances and odors. This includes personal protective equipment (PPE), administrative and work practice controls, and engineering controls. The contractor is responsible for the elimination or substitution of products as necessary to manage and control exposures related to chemical hazards, toxic substances and odors.
- 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.
- Refer to safety data sheets and product data sheets for additional information.

### Preparation:

- Ensure the KEE flashing substrate surface has been properly prepared and is clean, dry and free of incompatible materials and debris. Separate KEE flashing from residual asphalt, coal tar pitch, coatings and other existing flashing materials.
- Examine curbs, wall substrates, nailers and all other flashing substrate conditions.
- Ensure the flashing substrate conditions are acceptable to install the appropriate fasteners.
- Unroll the KEE membrane flashing and allow it to relax.
- Roof recover flashings:
  - Ensure existing flashing substrates have been thoroughly evaluated and are determined to be structurally sound, dry and meet all applicable requirements for induction welded flashings.
  - Remove or otherwise prepare existing flashings or coatings to ensure the surface is smooth and will provide a satisfactory substrate for new induction welded SENTINEL® KEE flashing.
  - Remove all existing incompatible materials or separate incompatible materials from direct contact with bare KEE. Refer to [Section 1.1](#) or contact [SOPREMA®](#) for additional information.
  - Where existing bitumen products and coating cannot be completely removed, install new gypsum or cement roof boards, or other acceptable wall sheathing, to provide a new substrate for induction welded KEE flashing.
- Test induction welding equipment by welding a sample of KEE to stress plates to ensure settings are satisfactory. Allow the plate to cool, then attempt to pull the KEE from the plate. A satisfactory weld is achieved when the KEE consistently and uniformly delaminates from the reinforcing fabric, leaving residual KEE bonded to the plate.

### Application:

- Install fasteners and induction welding plates to the vertical substrate a maximum of 12 in on-centers in both directions. Refer to [Table 3.2b](#) and [Figures 3.2a](#) and [3.2b](#).
- During the same day, induction weld the KEE to all plates that have been installed to prevent condensation from forming on plates overnight.

- Cut the KEE membrane to the desired length to conform to flashing conditions.
- Loose lay the KEE membrane over the flashing substrate and fasten at the leading top edge, or as required to secure the flashing in place.
- Ensure the side laps are a minimum of 3 in to accommodate minimum 1-1/2 in welded lap seams.
- Avoid locating membrane side and end laps over the stress plates. Where multiple layers of membrane occur, refer to the induction welding tool operating instructions to adjust settings.
- Clean side and end laps as necessary before welding seams. Refer to [Section 1.2](#).
- Remove all membrane wrinkles.
- Hot-air weld all side laps. Refer to [Section 5.1](#).
- Ensure the induction welding plates and bottom surface of the KEE membrane are dry and free of condensation before beginning induction welding.
- Locate each stress plate beneath the KEE membrane. Center the induction welder over each plate and activate the induction welding tool. Do not move the induction welder during the induction welding cycle.
- Once the weld is complete, immediately place a specialized magnet directly over each plate. Allow the magnets to remain in place until the plates have cooled.
- Where induction welds are suspect, examine the membrane attachment using a suction plate or plunger.
- Install butyl water cutoff, fasten and seal the leading edge of horizontal and vertical flashings at all terminations. Refer to [Figures 3.2a through 3.2b](#).







*Inspection:*

- Carefully probe all seams using a rounded-tip probe such as a cotter pin puller. Prevent damage to the membrane during inspection.
- Inspect all t-joints to ensure all t-joints have t-joint patches.
- Repair all open seams and damage found during inspection.
- When seam weld quality is suspect, inspect laps using destructive examination methods.
  - Cut 2 in wide weld samples across the seam 6 in on either side of the weld (2 in x 12 in wide strip).
  - Cut a minimum of three (3) sample welds in each suspect area.
  - Peel the test strips apart at the welds.
  - A satisfactory weld is achieved when the KEE consistently and uniformly delaminates from the reinforcing fabric.
- Inspect the membrane each day to ensure the membrane is properly fastened to the substrate.
- Each day, repair all voids, wrinkles, open and damaged laps, and all other deficiencies before proceeding.
- Temporary night seals are required to seal membrane terminations watertight. Remove all temporary night seals before resuming the installation.
- Ensure the membrane is sealed watertight each day.

**Table 3.2a Induction Welded KEE Flashing Membranes**

Membrane	Thickness	Reinforcement	Backing
<a href="#">SENTINEL® KEE P150</a>	60 mils	Polyester	Bare
<a href="#">SENTINEL® KEE P200</a>	80 mils	Polyester	Bare

**Table 3.2b Induction Welded KEE Flashing Membrane Fasteners**

Name	Graphic	KEE Membrane	Substrate/Deck Type
<a href="#">SOPRAFIX® #12 DP FASTENER</a> with SFS® isoweld Plate		<a href="#">SENTINEL® KEE P150,</a>	Steel,  Wood
<a href="#">SOPRAFIX® #12 DP FASTENER</a> with SENTINEL® Induction Weld Plate or Trufast IW Plate		<a href="#">SENTINEL® KEE P200</a>	
<a href="#">SOPRAFIX® #14 MP FASTENER</a> with SFS® isoweld Plate		<a href="#">SENTINEL® KEE P150,</a>	Steel,  Wood,  Concrete
<a href="#">SOPRAFIX® #14 MP FASTENER</a> with SENTINEL® Induction Weld Plate or Trufast IW Plate		<a href="#">SENTINEL® KEE P200</a>	
<a href="#">SOPRAFIX® #15 HD FASTENER</a> with SFS® isoweld Plate		<a href="#">SENTINEL® KEE P150,</a>	Steel,  Wood
<a href="#">SOPRAFIX® #15 HD FASTENER</a> with SENTINEL® Induction Weld Plate or Trufast IW Plate		<a href="#">SENTINEL® KEE P200</a>	

Name	Graphic	KEE Membrane	Substrate/Deck Type
Approved anchor with SENTINEL® isoweld Plate		<a href="#">SENTINEL® KEE P150,</a>	Concrete,
Approved anchor with SENTINEL® Induction Weld Plate or Trufast IW Plate		<a href="#">SENTINEL® KEE P200</a>	Masonry

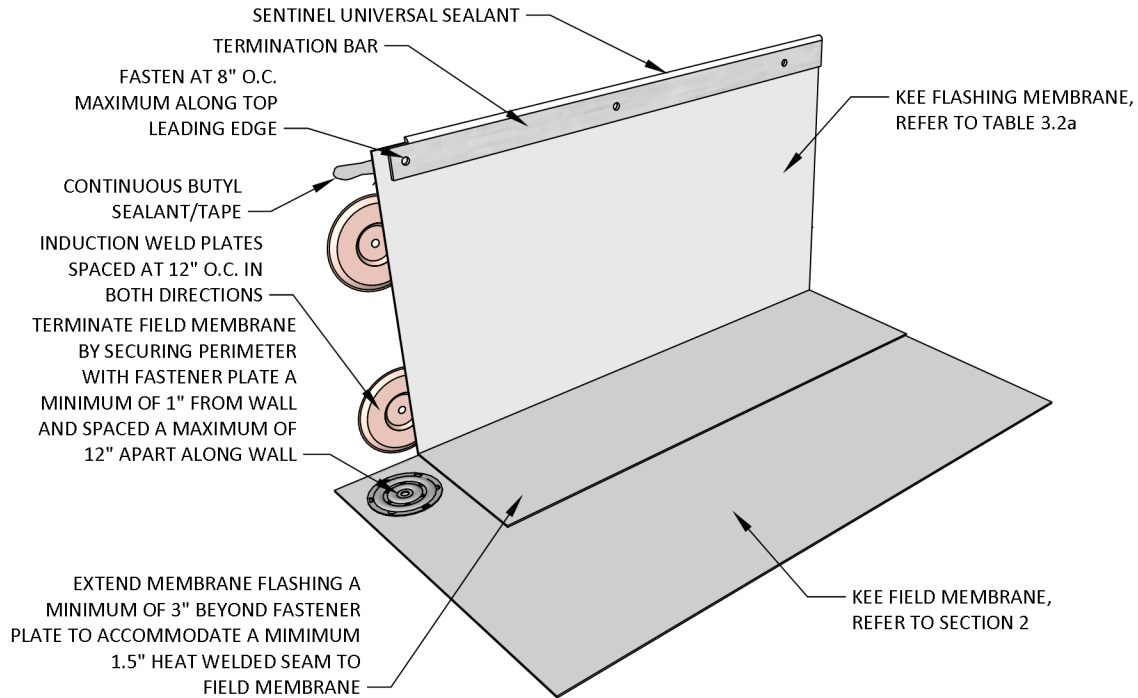


Figure 3.2a Induction Welded KEE Flashing Membrane at Wall/Curb with Horizontal Perimeter Fastening

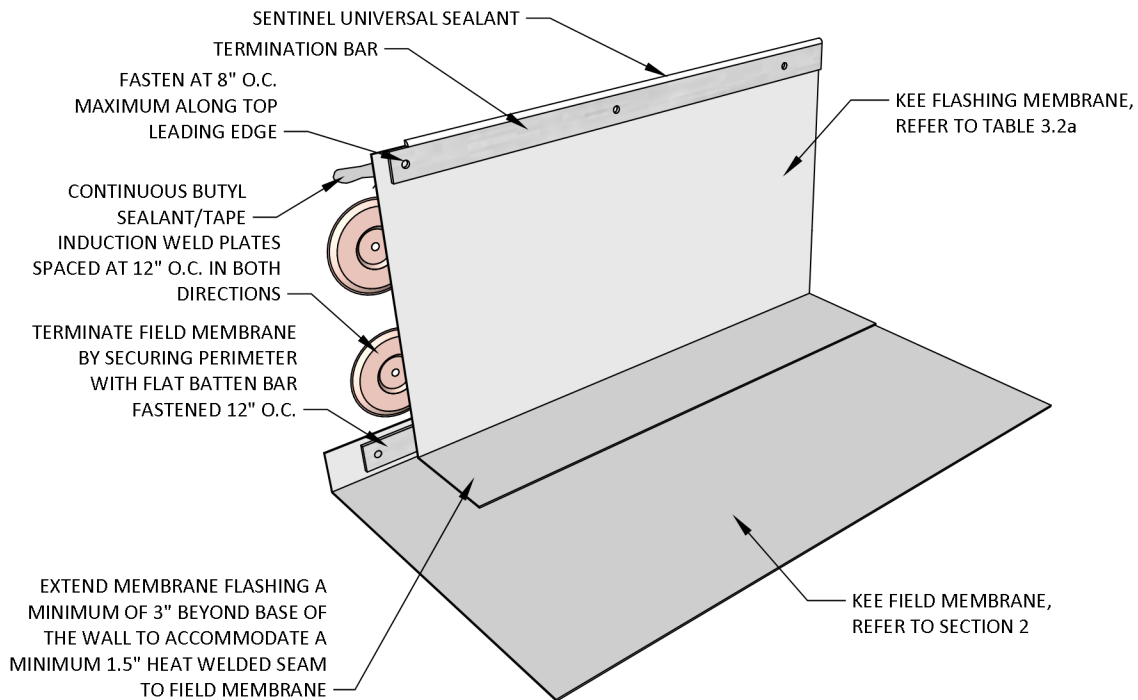


Figure 3.2b Induction Welded KEE Flashing Membrane at Wall/Curb with Vertical Perimeter Fastening



## 4 LIQUID-APPLIED FLASHING MEMBRANES

### 4.1 POLYMETHYL METHACRYLATE (PMMA)/POLYMETHACRYLATE (PMA) LIQUID-APPLIED FLASHING MEMBRANES

#### *General:*

- [SOPREMA®](#) offers [ALSAN® RS 230 FLASH](#) or [ALSAN® RS 260 LO FLASH](#) liquid-applied, reinforced flashing systems as acceptable alternates to KEE flashing membranes.
- ALSAN® RS liquid-applied flashing systems may be used with KEE membranes to form waterproof flashings for roof transitions, terminations and penetrations. Refer to [Figures 4.1a through 4.1d](#).
- The contractor and/or applicator is responsible for managing and controlling all exposures related to chemical hazards, toxic substances and odors. This includes personal protective equipment (PPE), administrative and work practice controls, and engineering controls. The contractor is responsible for the elimination or substitution of products as necessary to manage and control exposures related to chemical hazards, toxic substances and odors.
- 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.
- Refer to ALSAN® RS detail drawings, product data sheets, safety data sheets and published guidelines for additional information.

#### *Preparation:*

- Ensure all substrates are sound, dry clean and free of dust, debris, and adhesives.
- KEE membrane preparation:
  - Ensure the KEE field membrane is fastened to the substrate at all membrane terminations before installing liquid-applied flashing.
  - Install [SENTINEL® KEE T-JOINT PATCHES](#) over exposed fasteners and stress plates.
  - Lightly abrade the KEE membrane surface using a scouring pad only where liquid-applied flashing is to be applied.
  - Wipe the KEE membrane surface clean using [ALSAN® RS CLEANER](#), and allow to fully dry.
- Metal substrate preparation:
  - Prepare approved metal surfaces to near-white finish by abrasion and wipe clean with [ALSAN® RS CLEANER](#) before applying ALSAN® RS liquid-applied flashing systems.
- Concrete and masonry substrate preparation:
  - Substrates should be smooth and free of spalls, voids, blow holes and loose materials.
  - Use mechanical scarifying, grinding or shot blasting methods where necessary to provide a smooth, open surface free of laitance. The surface profile should be prepared to ICRI Concrete Surface Profile CSP 3, CSP 4 or SCP 5; CSP 3 being the preferred profile.
  - Refer to ASTM D4259 and D5295 for surface preparation guidance.
- Other approved substrates: Contact [SOPREMA®](#) and refer to ALSAN® RS installation instructions for other approved substrates and priming requirements.
- Conduct adhesion/peel tests by applying ALSAN® RS primer and liquid-applied membrane where necessary to ensure satisfactory adhesion is achieved.

#### *Application:*

- SENTINEL® KEE membranes do not require ALSAN® RS primers.
- Refer to [Table 4.1a](#) for substrates that require priming.
  - [ALSAN® RS 276 PRIMER](#) and [ALSAN® RS 222 PRIMER](#)

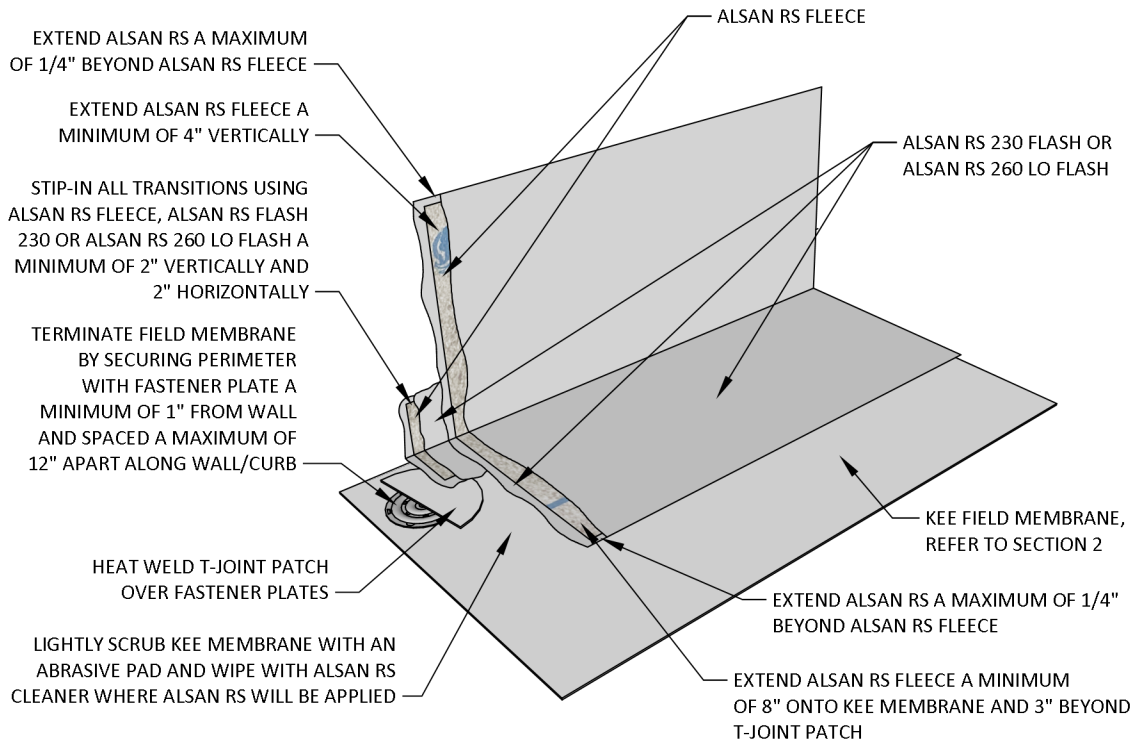
- Refer to product data sheets and safety data sheets, as well as ALSAN® RS installation instructions.
- Using a slow-speed mechanical agitator, thoroughly stir the entire container.
- Mix primer resin and catalyst approximately 2 minutes using a clean spiral agitator on slow speed or stir stick until evenly mixed. Do not aerate. Mix only the amount of primer that can be used within the application time.
- Apply the appropriate specified primer to dry, compatible substrates as required to enhance adhesion of new specified flashing materials. Refer to [Table 4.1a](#).
- Apply primer using brush or roller at the rate published on the product data sheet. Do not allow heavy accumulations of primer.
- Allow primer to fully cure before membrane application.
- [ALSAN® RS LO PRIMER](#)
  - Refer to product data sheets and safety data sheets, as well as ALSAN® RS installation instructions.
  - Using a slow-speed mechanical agitator, thoroughly stir the entire container.
  - Apply primer using brush or roller at the rate published on the product data sheet.
  - ALSAN® RS membranes and flashings should be installed to the primed surface within 24 hours of primer application.
- Pre-cut [ALSAN® RS FLEECE](#) polyester reinforcement to conform to roof terminations, transitions and penetrations. Cut reinforcement to ensure a minimum 2 in overlap of fleece at side-laps and end-laps. Ensure the liquid-applied flashing membrane is fully reinforced.
- Apply the base coat of catalyzed [ALSAN® RS 230 FLASH](#) or [ALSAN® RS 260 LO FLASH](#) resin onto the substrate using a brush or roller, working the liquid resin into the surface for complete coverage and full adhesion.
- Immediately apply the [ALSAN® RS FLEECE](#) reinforcing into the wet base coat of resin. Using a brush or roller, work the [ALSAN® RS FLEECE](#) reinforcement into the wet resin while applying the second coat of catalyzed ALSAN® RS FLASH resin to fully encapsulate the fleece.
- Extend the [ALSAN® RS 230 FLASH](#) or [ALSAN® RS 260 LO FLASH](#) resin a maximum of 1/4 in beyond the reinforcement.

*Inspection:*

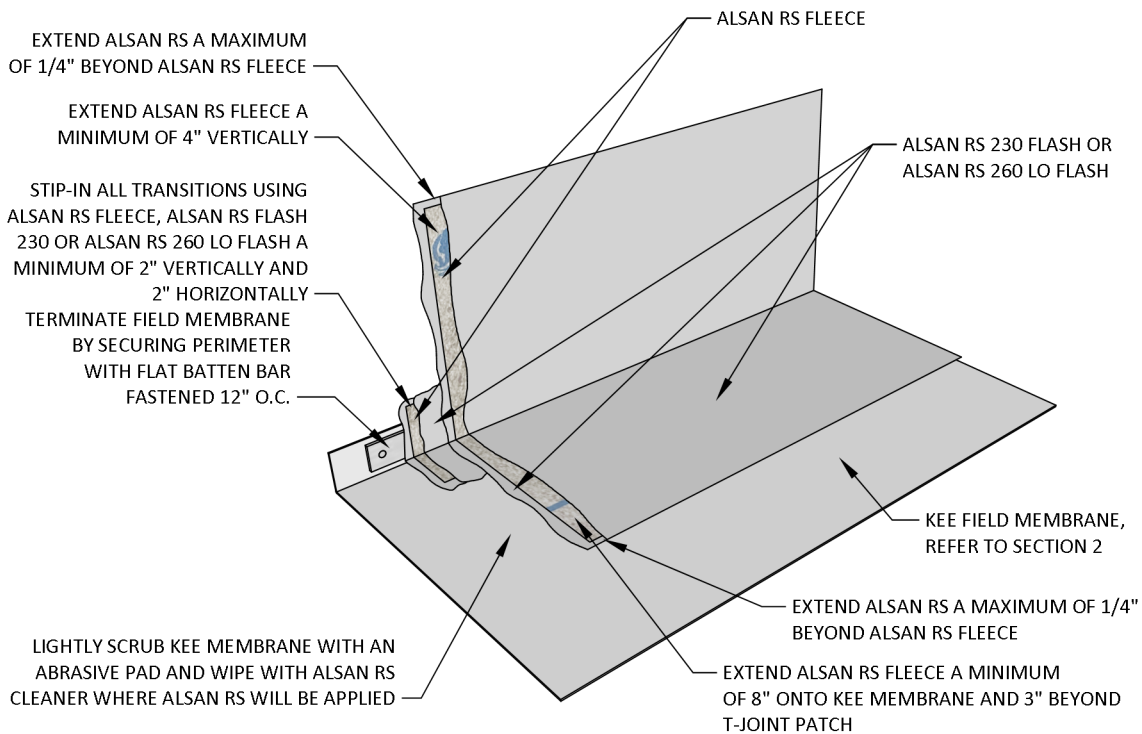
- As project conditions vary, monitor changing conditions, Adjust primer and membrane application methods as necessary to achieve the desired results.
- Refer to ALSAN® RS installation instructions for additional guidance.

Table 4.1a ALSAN® RS Flashing Substrate Primer	
Substrate	Primer
Prepared structural concrete	Prime with <a href="#">ALSAN® RS 276 PRIMER</a> or <a href="#">ALSAN® RS 222 PRIMER</a>
Prepared masonry	Prime with <a href="#">ALSAN® RS 276 PRIMER</a> or <a href="#">ALSAN® RS 222 PRIMER</a>
Conditioned, un-treated wood	Prime with <a href="#">ALSAN® RS 276 PRIMER</a> or <a href="#">ALSAN® RS 222 PRIMER</a>
Approved gypsum roof boards	Prime with <a href="#">ALSAN® RS 276 PRIMER</a> or <a href="#">ALSAN® RS 222 PRIMER</a>
Approved cement roof boards	Prime with <a href="#">ALSAN® RS 276 PRIMER</a>
Prepared metal	Optional <a href="#">ALSAN® RS LO PRIMER</a>
<a href="#">SENTINEL® P150</a> , <a href="#">SENTINEL® P200</a> , <a href="#">SENTINEL® P150 HFB</a> , <a href="#">SENTINEL® P200 HFB</a> ,	Do not prime. Refer to <i>Preparation</i> .

\*Do not apply ALSAN® RS directly to exposed adhesives or [SENTINEL® UNIVERSAL SEALANT](#) sealant.



*Figure 4.1a ALSAN® RS Flashing at Wall/Curb with Horizontal Perimeter Fastening*



*Figure 4.1b ALSAN® RS Flashing at Wall/Curb with Vertical Perimeter Fastening*

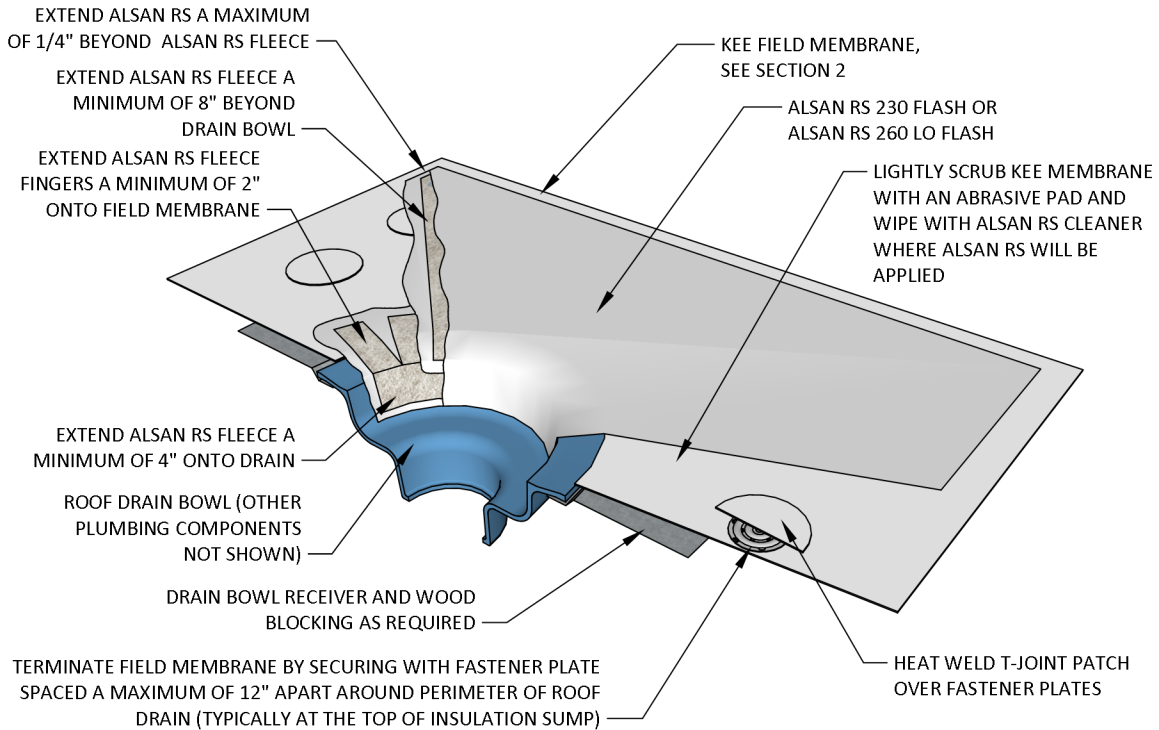


Figure 4.1c ALSAN® RS Flashing at Roof Drain

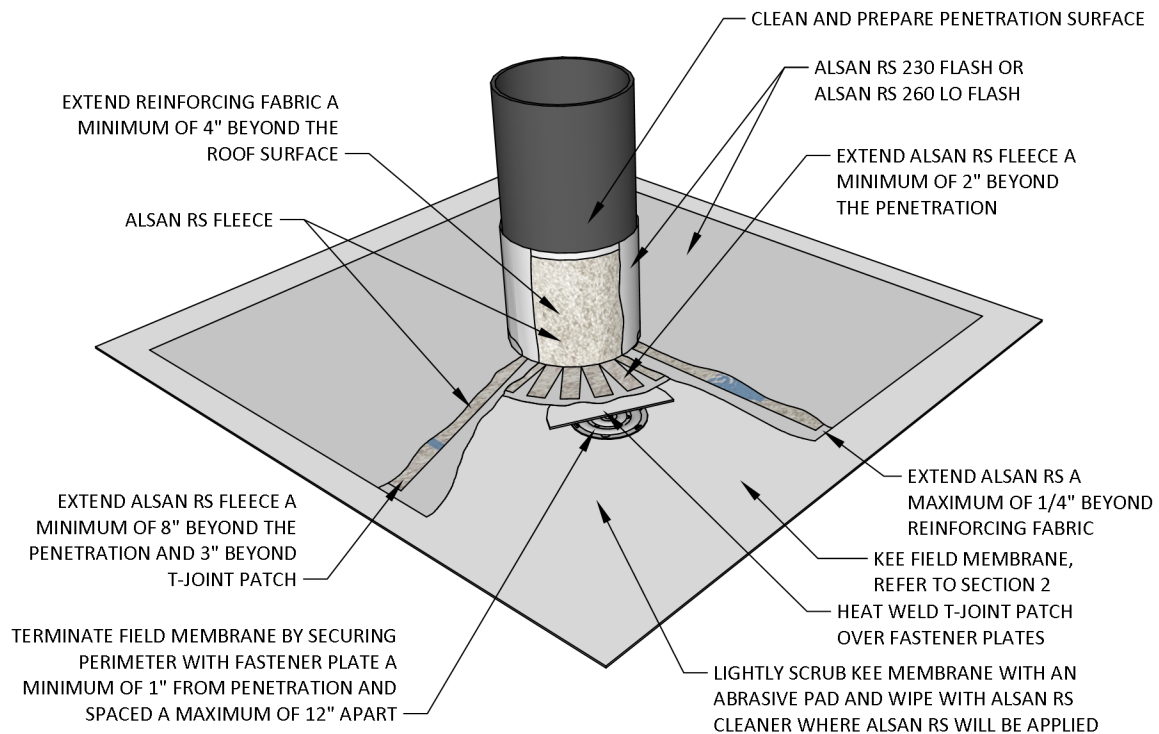


Figure 4.1d ALSAN® RS Flashing at Penetration

## 5 MISCELLANEOUS

### 5.1 KEE HOT-AIR WELDED SIDE AND END LAPS

#### *General:*

- All SENTINEL® KEE membranes require a minimum 1-1/2 in continuous hot-air welded seam at all side and end laps.
- Refer to [Section 1.3](#) for hot-air welding procedures.
- The contractor and/or applicator is responsible for managing and controlling all exposures related to chemical hazards, toxic substances and odors. This includes personal protective equipment (PPE), administrative and work practice controls, and engineering controls. The contractor is responsible for the elimination or substitution of products as necessary to manage and control exposures related to chemical hazards, toxic substances and odors.
- 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.

#### *Preparation:*

- Ensure all substrates and bottom surfaces of bare membranes are dry and free of debris.
- Clean laps as necessary. Refer to [Section 1.2](#).

#### *Application:*

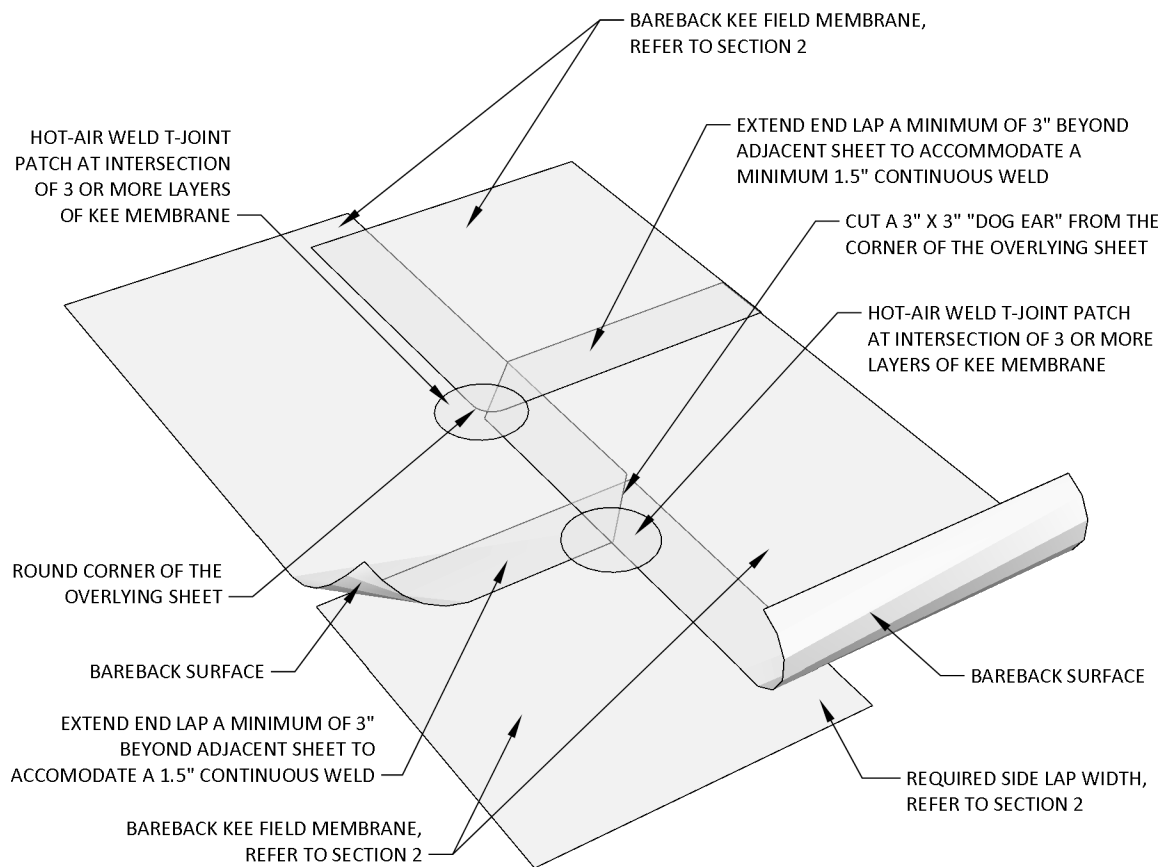
- Hot-air welders shall be used to seal all membrane lap seams.
- Position the membrane so that it overlaps the adjacent membrane at the required side lap width.
- Weld the laps using an automatic welding machine or hand welder to maintain a 1-1/2 in uniform, continuous weld. Refer to [Section 1.3](#).
- At end-laps of bare KEE, dog-ear and round all corners. Extend the end-lap a minimum of 3 in beyond the adjacent roll. Refer to [Figure 5.1a](#).
- Adhered fleece-backed membrane end-laps shall be butted together and a 6 in membrane coverstrip shall be welded over the butted joint. Refer to [Figure 5.1b](#).
- [SENTINEL® KEE T-JOINT PATCHES](#) shall be hot-air welded to the membrane at all t-joint intersections. Chamfer the welding seam prior to installing [SENTINEL® KEE T-JOINT PATCHES](#) using an edging tool or by heating the edge and rolling.

#### *Inspection:*

- Carefully probe all seams using a rounded-tip probe such as a cotter pin puller. Prevent damage to the membrane during inspection.
- Inspect all t-joints to ensure all t-joints have t-joint patches.
- Repair all open seams and damage found during inspection.
- When seam weld quality is suspect, inspect laps using destructive examination methods.
  - Cut 2 in wide weld samples across the seam 6 in on either side of the weld (2 in x 12 in wide strip).
  - Cut a minimum of three (3) sample welds in each suspect area.
  - Peel the test strips apart at the welds.
  - A satisfactory weld is achieved when the KEE breaks, or consistently and uniformly delaminates from the reinforcing fabric.
- Inspect the membrane each day to ensure the membrane is properly fastened to the substrate.
- Each day, repair all voids, wrinkles, open and damaged laps, and all other deficiencies before proceeding.

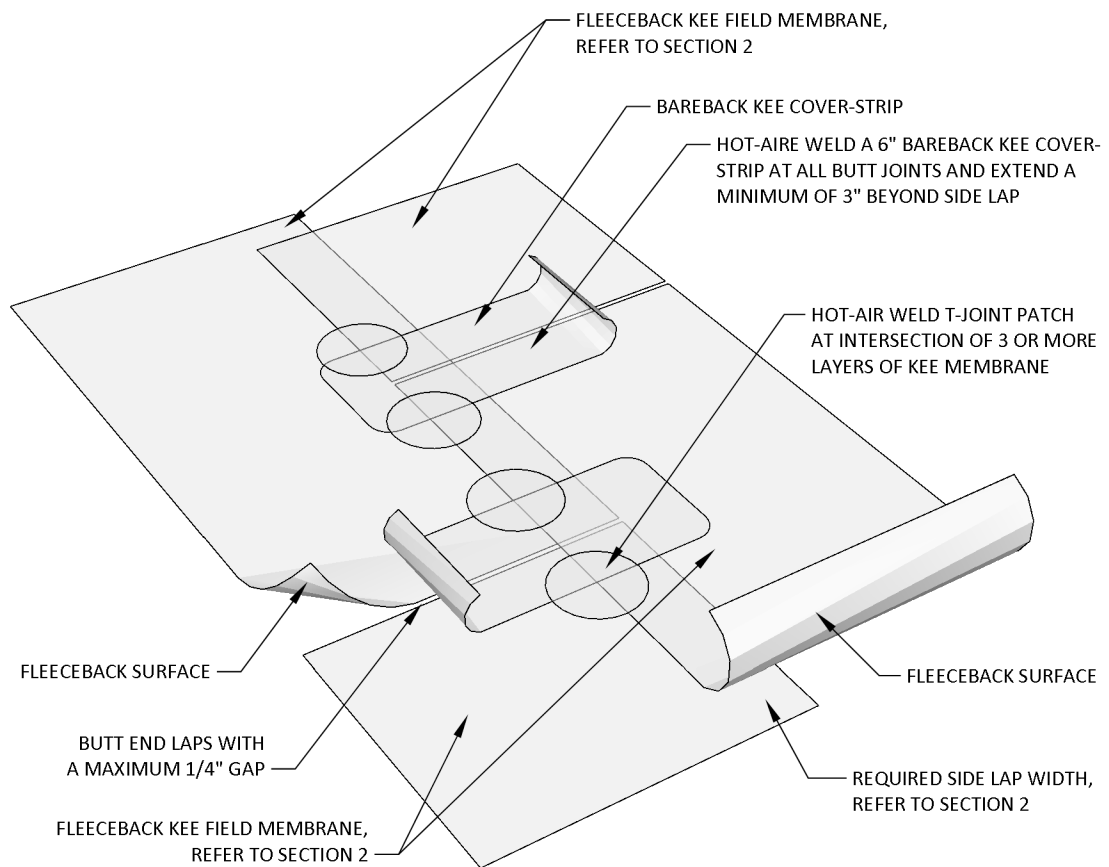
- Temporary night seals are required to seal membrane terminations watertight. Remove all temporary night seals before resuming the installation.
- Ensure the membrane is sealed watertight each day.

<b>Table 5.1a KEE Membrane End-Laps</b>		
<b>Membrane</b>	<b>End Lap</b>	<b>Application</b>
<a href="#">SENTINEL® KEE P150</a>	3 in minimum overlap	Minimum 1.5 in continuous weld.
<a href="#">SENTINEL® KEE P200</a>	3 in minimum overlap	Minimum 1.5 in continuous weld.
<a href="#">SENTINEL® KEE P150 HFB</a>	Butt end laps	Minimum 6 in <a href="#">SENTINEL® P150</a> or <a href="#">SENTINEL® P200</a> cover strip centered over end laps with a minimum 1.5 in continuous weld on each side.
<a href="#">SENTINEL® KEE P200 HFB</a>	Butt end laps	Minimum 6 in <a href="#">SENTINEL® P200</a> cover strip centered over end laps with a minimum 1.5 in continuous weld on each side.



*Figure 5.1a Bareback KEE Field Membrane Side And End Laps*





*Figure 5.1b Fleeceback KEE Field Membrane Side And End Laps*

## 5.2 WALKWAYS & SACRIFICIAL PROTECTION PADS

### *General:*

- [SENTINEL® WALKWAY PAD](#) protects roof membranes from damage caused by foot traffic or other rooftop activities. This product is compatible with new or existing KEE roof membranes.
- [SENTINEL® WALKWAY PAD](#) is also used as a sacrificial layer for additional protection when rooftop equipment, fixtures, lightning protection, etc. are installed directly on the roof surface.
- Other bare KEE membranes may also be used in lieu of [SENTINEL® WALKWAY PAD](#). Refer to [Figures 5.2a through 5.2b](#).
- The contractor and/or applicator is responsible for managing and controlling all exposures related to chemical hazards, toxic substances and odors. This includes personal protective equipment (PPE), administrative and work practice controls, and engineering controls. The contractor is responsible for the elimination or substitution of products as necessary to manage and control exposures related to chemical hazards, toxic substances and odors.
- 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.

### *Preparation:*

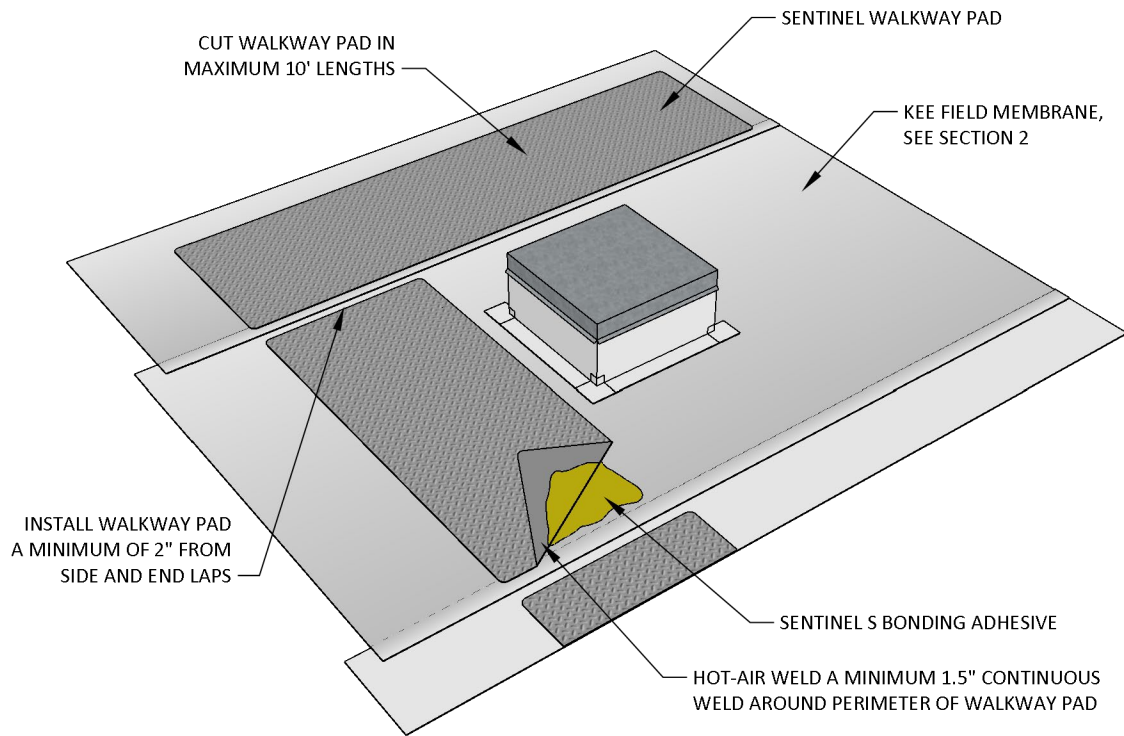
- Ensure walkways, sacrificial protection pads and membrane surfaces are clean, dry and free of debris. Refer to [Section 1.2](#).

### *Application:*

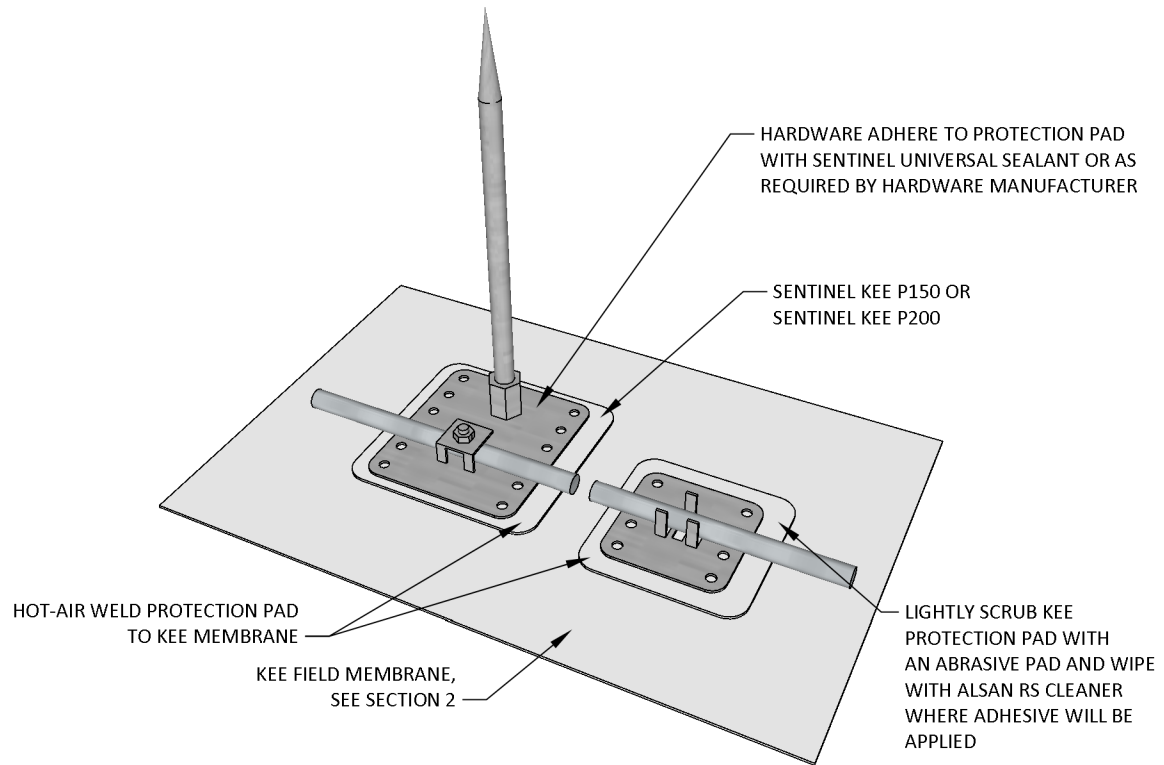
- Roll out walkways and protection pads and cut desired length and allow to relax in the desired position. Walkway pads should be cut in maximum 10' lengths.
- Walkways and protection pads should be placed a minimum of 2 in from membrane side laps, end laps, and flashing membranes. Refer to [Figure 5.2a](#).
- [SENTINEL® S BONDING ADHESIVE](#) may be used in the field of walkways and protection pads to adhere to the KEE membrane if desired.
- Use a hot-air welder to weld the walkway and protection pad to the membrane providing a minimum 1.5 in wide continuous weld around the entire perimeter.
- When rooftop equipment and fixtures are to be installed directly onto the roof surface, ensure the sacrificial membrane is installed to protect the underlying KEE membrane.
- For equipment protection pads such as for lightning protection, refer to [Figure 5.2b](#).

### *Inspection:*

- Ensure walkways and sacrificial protection pads have a continuous weld around the perimeter.



*Figure 5.2a Walkways*



*Figure 5.2b Sacrificial Protection Pads*

## 5.3 KEE ACCESSORIES

General:

- Refer to [Table 5.3a](#) for SENTINEL® KEE membrane and flashing accessories products and basic application.
- Refer to the Product Data Sheets and Safety Data Sheets for additional product information.

Table 5.3a KEE Accessories	
Product	Application
<a href="#">SENTINEL® VCM</a>	Polyvinyl-coated sheet metal used to produce shop fabricated edge metals and other details for welding KEE membranes.
<a href="#">SENTINEL® KEE PREFABRICATED CORNERS</a>	Fiberglass reinforced KEE flashings used to flash inside and outside corners.
<a href="#">SENTINEL® KEE T-JOINT PATCHES</a>	Round, polyester reinforced KEE patches used to seal t-joint intersections.
<a href="#">SENTINEL® KEE BOOT FLASHING</a>	Prefabricated KEE closed and split pipe flashing for penetrations 1 in to 6 in. and 6 in to 12 in.
<a href="#">SENTINEL® WALKWAY PAD</a>	Slip resistant protective pad used to create a walk path and protect field membranes from traffic.
<a href="#">SENTINEL® UNIVERSAL SEALANT</a>	Moisture curing, polyether, elastomeric sealant for KEE membrane terminations.
BUTYL SEALANT	100 percent solids, water cutoff, gun-grade butyl used to seal flashing details between KEE membrane and approved substrates.
BUTYL TAPE	100 percent solids, water cutoff tape to seal flashing details between KEE membrane and approved substrates.
FOIL TAPE BOND BREAKER	Bond breaker tape, nominal 2 in wide, adhesive-backed aluminum foil: <ul style="list-style-type: none"> <li>• Applied to vinyl coated metal edge detail joints prior to stripping-in joints with KEE flashing membrane.</li> <li>• Applied to pipes and other flashing substrates to cover incompatible materials such as asphalt.</li> </ul>