



Kingfield Gel-Flex Composite Waterproofing Systems

Heavy-duty exposed surface reinforced flexible flashing

DESCRIPTION

Duroflex is a 60 mil uncured neoprene flashing used on exposed walls, curbs, penetrations, expansion joints, and angle changes.

Duroflex provides added reinforcement and movement capability at cracks, construction joints, control joints at changes of plane, expansion joints, drains, and in exposed conditions such as flashing parapets, walls, and curbs.

Duroflex provides waterproof flexibility where minor movement, change in level direction, and dissimilar materials occur or is anticipated.

Duroflex is a 6-24 inch wide membrane that has thermoset properties that provide ease in forming around penetrations and corners as well as detailing expansion joints and drains.

ADVANTAGES

- 100% uncured solids** Maintains volume and flexibility to ensure a watertight bond.
- Maintains excellent adhesion** Forms to uneven angled, horizontal, and vertical surfaces.
- Maintains flexibility** 300% elongation dynamically responds to movement, thermal expansion, and contraction to maintain a watertight bond.
- Easy workability** Applies and adheres in cold temperatures. Trims cleanly.
- Conforms to irregular spaces** Extreme flexibility details corners, pultrusion, and plane changes and bonds uniformly with **Hydrogel (or Turboseal) Gel-Flex Waterproofing Systems**. **Duroflex** retains its physical properties in the most irregular spaces ensuring long term effectiveness.

*Contact Kingfield for temperature below 32°F to determine whether a primer is required.

DUROFLEX	CHARACTERISTICS	DUROFLEX PROPERTIES	RESULTS	TESTING METHOD
Appearance	Black Neoprene rubber - Clear liner	Total Thickness	60 mils (±10%)	ASTM D751-66
Roll Dimensions	Variable*	Tensile Strength	1400 psi	ASTM D412, DIE C
*Length	100 feet	Longitudinal	1305 psi	ASTM D412, DIE C
*Width	6, 12, 18, or 24 inches	Transverse	1305 psi	ASTM D412, DIE C
Weight	0.50 lb/ft ² (±0.01lb/ft ²)	Elongation	300%	ASTM D412, DIE C
		Tear Resistance	125 lb/in	ASTM D624, DIE C
		Brittleness Point	-30°F (No Break)	ASTM D2137
		OZONE Resistance (@20% Ext., 100MPa, 100 hrs @104°F)	No Cracks	ASTM D1149
		Water Absorption (46 hours @ 158°F)	-8% (±2%)	ASTM D471

APPLICATION INSTRUCTIONS

- *FOLLOW ALL KINGFIELD DUROFLEX INSTALLATION AND APPLICATION INSTRUCTIONS.
- *Ensure all detail and reinforcement areas are water, oil, dust, and debris free.

STORAGE

Keep in Dry Storage out of direct heat and sunlight between 50-80 degrees Fahrenheit.

HEALTH AND SAFETY: Consult the MSDS

DUROFLEX DETAILING AND REINFORCEMENT COMPONENTS

EXPOSED FLASHING APPLICATIONS:	COVERED FLASHING APPLICATIONS:	WATERPROOFING REINFORCEMENT APPLICATIONS:
Detailed exposed flashing work is a sandwich of: <ol style="list-style-type: none"> 1. Bonding Adhesive. 2. Duroflex reinforcement. <ul style="list-style-type: none"> • Splicing Cement between seams and laps. • Lap Sealant for exposed seams and laps. 	Detailed covered flashing work is a sandwich of: <ol style="list-style-type: none"> 1. Bonding Adhesive. 2. Duroflex reinforcement. <ul style="list-style-type: none"> • Splicing Cement between seams and laps. 3. 80-90 mil Hydrogel (or Turboseal). 4. GFG20X HDPE reinforcement sheet. 	Detailed reinforcement work is a sandwich of: <ol style="list-style-type: none"> 1. 80-90 mil Hydrogel (or Turboseal). 2. Duroflex reinforcement. <ul style="list-style-type: none"> • Splicing Cement between seams and laps. 3. 80-90 mil Hydrogel (or Turboseal). 4. GFG20X HDPE reinforcement sheet.

DUROFLEX INSTALLATION AND APPLICATION INSTRUCTIONS

Kingfield has developed a set of guideline details for installing hot spray applied **Hydrogel Gel-Flex** or cold applied **Turboseal Gel-Flex** Waterproofing Systems in waterproofing/roofing applications, which address standard and common detailing conditions. If conditions arise which cannot be handled by these standard guideline details, consult Kingfield for assistance.

All surfaces to which **Hydrogel Gel-Flex** or **Turboseal Gel-Flex** Waterproofing Systems and flashing is to be applied must be clean and dry. All transitions must be sharply formed having no irregular surfaces or edges.

In both waterproofing and roofing applications, all critical detailing conditions are typically triple protected utilizing a reinforcing layer embedded into and top coated with **Hydrogel** (or **Turboseal**) monolithic membrane.

The reinforcing material must be firmly embedded into the initial coat of membrane before the second coat of membrane is applied to ensure positive adhesion, free of trapped air.

KINGFIELD FLASHING/REINFORCING SYSTEM:

Duroflex is the heavy duty reinforcing sheet which can be used at all cracks, joints and change-in-plane, and must be used at drains and expansion joints or anywhere large, rough transitions occur as with metal plates. **Duroflex** is also used as the exposed flashing material.

As a reinforcing material, **Duroflex** is completely encapsulated within coats of **Hydrogel** (or **Turboseal**), no additional adhesives or sealants are required.

*Any other material being considered as reinforcing for the **Hydrogel Gel-Flex** or **Turboseal Gel-Flex** Waterproofing Systems must be approved in advance by Kingfield.*

EXPOSED FLASHING

In applications that require exposed flashing, such as roofing, where **Hydrogel Gel-Flex** or **Turboseal Gel-Flex** Waterproofing Systems are to be used, it is typically good practice to extend the flashings up above the finished exposed surface 8 -12 inches. Parapets, curbs, pipes and walls are examples of where flashings must extend above the surface.

Since **Hydrogel** (and **Turboseal**) cannot be left exposed, **Duroflex** is used for all exposed flashing conditions. **Duroflex** is typically adhered with a Bonding Adhesive and Splicing Cement and the edges sealed with a Lap Sealant.

*Any other material being considered as an exposed flashing for the **Hydrogel Gel-Flex** or **Turboseal Gel-Flex** Waterproofing Systems must be approved in advance by Kingfield.*

DUROFLEX ADHESIVES AND SEALANTS

BONDING ADHESIVE

Surface Bonding Adhesive is used specifically for bonding **Duroflex** to most clean, sound substrates (i.e. metal, concrete, wood, etc.). Bonding Adhesive is commonly available in 5 gallon pails or 1 gallon buckets. Bonding Adhesive MUST be thoroughly stirred before and during use. Commonly, one gallon of adhesive is sufficient to cover 60 square feet of BOTH surfaces to be bonded.

1. Application is typically done by brush or roller, applying an even coat on both the backside of the **Duroflex** and the substrate. When dry, but still tacky to the touch, the two materials can be mated together.
2. *Once contact is made it is impossible to re-position the **Duroflex** -so proceed with caution.*
3. Pressure should be applied to the entire bonded area to ensure a positive bond is achieved.
 - A metal seam roller is typically used to apply pressure to the seam.

**Bonding Adhesive should not be used in temperatures below 32°F (0°C). For cold temperatures (below 65°F, 18.3°C) store the material at room temperature just prior to use.*

SPLICING CEMENT

Splicing Cement is used specifically for bonding **Duroflex** to itself at seams and laps. Splicing Cement is commonly available in 5 gallon pails or 1 gallon buckets. Splicing Cement MUST be thoroughly stirred before and during use. Commonly, one gallon of cement is sufficient to cover 150 linear feet of BOTH surfaces for a 4 inch wide seam.

1. Application is typically done by brush or roller, applying an even coat to both sheets. When dry, but still tacky to the touch, the two sheets can be mated together.
2. *Once contact is made it is impossible to re-position the **Duroflex** - so proceed with caution.*
3. Pressure should be applied to the entire bonded area to ensure a positive bond is achieved.
 - A metal seam roller is typically used to apply pressure to the seam.

**Splicing Cement should not be used in temperatures below 32°F (0°C). For cold temperatures (below 65°F, 18.3°C) store the material at room temperature just prior to use.*

LAP SEALANT

Lap Sealant is used specifically for sealing all exposed edges of a seam or lap made between sheets of **Duroflex**. Lap Sealant is commonly available in tubes containing 1/10 of a gallon with 10 tubes packaged in a case. Each tube will cover approximately 22 linear feet of seam with a 3/8 inch bead of material.

Application is typically done with the aid of a caulking gun directly along the flashing sheet edges. Any excess adhesive should first be cleaned from the area where the Lap Sealant is to be applied.

The bead of sealant is typically dressed off resulting in a smooth transition from one sheet to another.

SPECIFIC DETAILING CONDITIONS

- **ALL DETAILING, FLASHINGS AND TERMINATIONS SHALL BE DONE IN ACCORDANCE WITH KINGFIELD'S INSTALLATION GUIDELINES AND DETAILS.**
- **REFER TO KINGFIELD'S STANDARD GUIDELINE DETAILS FOR DRAWINGS DEPICTING THE FOLLOWING:**

SHRINKAGE CRACKS

For cracks over 1/16" but less than 1/4" in width, apply **Hydrogel** (or **Turboseal**) membrane, 80-90 mils thick, over the crack area. Center a 6" wide strip of **Duroflex** over the crack and embed firmly into the warm membrane. Apply another coat of **Hydrogel** (or **Turboseal**) membrane, 80-90 mils thick, over the reinforcing sheet, totally encapsulating it in **Hydrogel** (or **Turboseal**) membrane.

CONSTRUCTION OR CONTROL JOINTS

Apply **Hydrogel** (or **Turboseal**) membrane, 80-90 mils thick, over the joint area. Center a 6" wide strip of **Duroflex** over the joint and embed firmly into the warm membrane. Apply another coat of **Hydrogel** (or **Turboseal**) membrane, 80-90 mils thick, over the reinforcing sheet totally encapsulating it in membrane. When installing **Hydrogel Gel-Flex** or **Turboseal Gel-Flex** Waterproofing Systems, pre-treating construction or control joints is typically not necessary.

PRECAST JOINTS

Side Joints:

1. Fill the joints between precast panels with concrete or an acceptable repair mortar.
2. Apply **Hydrogel** (or **Turboseal**) membrane, 80-90 mils thick, over the joint area. Center a strip of **Duroflex** over the joint, extending 3" beyond both sides of the joint, and embed firmly into the warm membrane. Apply another coat of **Hydrogel** (or **Turboseal**) membrane, 80-90 mils thick, over the reinforcing sheet totally encapsulating it in membrane.

End Joints:

1. Fill the joints between precast panels with concrete or an acceptable repair mortar.
2. Apply **Hydrogel** (or **Turboseal**) membrane, 80-90 mils thick, over the joint area. Center a strip of **Duroflex** over the joint, extending 9" beyond both sides of the joint, and embed firmly into the warm membrane. Apply another coat of **Hydrogel** (or **Turboseal**) membrane, 80-90 mils thick, over the reinforcing sheet totally encapsulating it in membrane.

COMPOSITE DECK (PRECAST W/TOPPING SLAB) JOINT TREATMENT

- **Side Joint Treatment: Method 1**
 - Saw cut the concrete topping slab to a depth 1/4 its thickness, directly over the joints of the precast. Apply **Hydrogel** (or **Turboseal**) membrane, 80-90 mils thick, over the joint area. Center a 6" wide strip of **Duroflex** over the joint and embed firmly into the warm membrane. Apply another coat of **Hydrogel** (or **Turboseal**) membrane, 80-90 mils thick, over the reinforcing sheet totally encapsulating it in membrane.
- **Side Joint Treatment: Method 2**
 - Locate on the concrete topping slab where the precast joints are below. Apply **Hydrogel** (or **Turboseal**) membrane, 80-90 mils thick, over this area. Center a strip of **Duroflex**, double the slab thickness plus 6" in width, over the joint area and embed firmly into the warm membrane. Apply another coat of **Hydrogel** (or **Turboseal**) membrane, 80-90 mils thick, over the reinforcing sheet totally encapsulating it in membrane.
- End Joint Treatment: (Either Method 1 or 2, outlined above, may be used to detail this condition with the following changes)
 - If Method 1 is followed, **Duroflex** must be a minimum of 12" in width.
 - If Method 2 is followed, **Duroflex** must be double the slab thickness plus 12" in width.

EXPANSION JOINTS

Expansion joints can be detailed a number of different ways, depending on the various structural and/or design considerations for each project. The descriptions below outline typical methods of how a typical expansion joint may be detailed using **Duroflex** and **Hydrogel** (or **Turboseal**). Specific project requirements may dictate that these details be modified or abandoned altogether in favor of proprietary expansion joint materials and systems.

- Expansion Joints < 1" in Width: (50% total designed movement)
 - Apply **Hydrogel** (or **Turboseal**) membrane, 80-90 mils thick, over the joint area. Center a strip of **Duroflex** over the joint, extending 3" beyond both sides of the joint, and embed firmly into the warm membrane. Apply another coat of **Hydrogel** (or **Turboseal**) membrane, 80-90 mils thick, over the reinforcing sheet totally encapsulating it in membrane.
- Expansion Joints > 1" but < 2" in Width: (50% total designed movement)
 - Lay a foam rod or tube 1" larger in diameter than the joint width over the opening of the joint.
 - Apply **Hydrogel** (or **Turboseal**) membrane, 80-90 mils thick, up to the joint area. Embed a strip of **Duroflex** firmly into the warm membrane extending 6" beyond one side of the joint. The **Duroflex** should then be laid over the foam rod and extend another 6" (152.4mm) beyond the other side of the joint, again embedded into the **Hydrogel** (or **Turboseal**) warm membrane.
 - Apply additional **Hydrogel** (or **Turboseal**) over the **Duroflex** and install another strip of **Duroflex**, extending a minimum of 9" beyond both edges of the first layer of **Duroflex**. Finally coat over the **Duroflex**, except where it is looped up and over the foam rod, totally encapsulating the sheet edges.
 - The anticipated movement of the deck at expansion joints is designed to be taken by the excess looped **Duroflex**. The detail should never be designed or constructed so that stress occurs within the flashing sheet itself.
 - In waterproofing applications, the foam rod may be inserted slightly into the joint leaving at least half of the rod "proud" of the surface of the deck to provide a hump/water shed. Additional protection must be provided over the completed joint assembly to protect the detailing from subsequent backfilling and/or topping material installation.

DUROFLEX DETAILING INSTRUCTIONS:

- **THE FOLLOWING DETAILS ARE EXTREMELY LABOR INTENSIVE AND SENSITIVE.**
- **CARE MUST BE EXERCISED IN THEIR CONSTRUCTION.**
- **THESE DETAILS ARE NOT INTENDED TO BE USED TO ACCOMMODATE FOR MOVEMENT IN EXCESS OF THE JOINT WIDTH OR DUE TO SEISMIC STRESSES.**

ROOF DRAINS

1. With the clamping ring removed, apply **Hydrogel** (or **Turboseal**), 80-90 mils thick, around the drain, extending it from the edge of the drain bowl to a point 12" out onto the deck beyond the edge of the deck flange, in all directions.
2. Embed a sheet of **Duroflex** firmly into the membrane, centered over the drain bowl, while the membrane is still warm. The **Duroflex** reinforcing should extend a minimum of 6" beyond the edge of the deck flange in all directions. Slits should be cut to accommodate for the clamping ring bolts and the center of the reinforcing must be cut out.
3. Re-install the drain clamping ring, making sure that the bolts are all properly tightened.
4. Finish by coating over all the **Duroflex** reinforcing, exposed beyond the clamping ring, with a 80-90 mil thick coat of **Hydrogel** (or **Turboseal**) totally encapsulating it.

PENETRATIONS

- Flash all penetrations (pipes, angles, vents, etc.) passing through the **Hydrogel** (or **Turboseal**) membrane. All penetrations must be properly secured to the deck/cast into the deck.
- The **Duroflex** flashing seal must be made directly to the penetration passing through the membrane. The **Duroflex** flashing should not be terminated to an intermediate element (metal flashing, insulation, surface treatment, etc.) which itself could fail and allow moisture to bypass the flashing and membrane.
- Flexible penetrations (i.e. lightning cable) must be enclosed in a stable "goose neck" vent secured to the deck and properly flashed with **Duroflex**.
- The performance of the **Hydrogel** (or **Turboseal**) weakened by temperatures greater than 180 degrees F, hot pipes must first be surrounded by an intermediate "cold" sleeve pipe that allows the flashing to be applied to it instead of directly to the hot pipe itself.

EXPOSED FLASHINGS (i.e. CURBS, PARAPETS, WALLS, ETC.)

Hydrogel Gel-Flex or **Turboseal Gel-Flex** Waterproofing Systems are not intended to be left exposed. For all exposed flashing conditions, **Duroflex** must be used. For details that will be covered with subsequent cladding (stone, metal, etc.) the **Hydrogel** (or **Turboseal**) membrane may be extended with the flashing as well.

Duroflex sheet when installed must extend out onto the deck a minimum of 3" and up the curb, parapet, wall, etc., a minimum of 8" above the finished surface of the roof (whenever possible). **Duroflex** must be adhered to the vertical surface with bonding adhesive, starting at a point 3" off the deck and then up the full height at which point it must be properly terminated.

The 3" of unbonded **Duroflex** on the vertical and the 3" that extends out onto the deck must be firmly embedded into the applied **Hydrogel** (or **Turboseal**) membrane, applied at a thickness of 80-90 mils. The **Duroflex** must be set into the membrane so that no air pockets develop and it must be set tight into the corner so that no bridging (voids) is evident behind the flashing. Another coat of membrane at 80-90 mils thick is then applied to cover the 3" (76.2mm) of flashing that extends out onto the deck, totally encapsulating it. Only the horizontal portion of the flashing sheet need be totally encapsulated in membrane.

PROPER APPLICATION WITH ADHESIVES

Bonding Duroflex to an acceptable substrate:

- Thoroughly mix the bonding adhesive before using and frequently while in use.
- Apply the bonding adhesive evenly, without globs or puddles, with a 9" wide short nap roller or 4" wide brush to both the flashing sheet and the substrate at a rate covering approximately 60 square feet (both surfaces) per gallon.

DO NOT APPLY BONDING ADHESIVE TO A SPLICE (LAP) AREA.

1. Allow the bonding adhesive to dry until it is tacky, but will not slide when pushed with a finger or string up when touched with a dry finger.
2. Roll the coated membrane onto the coated substrate, avoiding wrinkles.
3. To ensure complete adhesive contact, roll the entire area with a metal hand roller.
4. Install adjoining sheets in the same manner, overlapping the previous sheet a minimum of 3".

Bonding Duroflex to itself (splicing/seaming):

- Fold back the top sheet of the lap to expose both surfaces to be mated. Be sure that both flashing surfaces are clean.
 - Thoroughly mix the splicing cement before using and frequently while in use.
1. Apply the splicing cement evenly, without globs or puddles, with a 4" wide brush to both of the flashing sheet surfaces at a rate of approximately 150 linear feet (both surfaces) per gallon.
 - Both flashing sheet surfaces should be coated with adhesive at the same time to achieve a more uniform drying time.
 - Starting at the beginning of where the adhesive was applied, check the splicing cement for proper drying. The splicing cement should not slide when pushed with a finger or string up when touched with a dry finger.
 2. When the splicing cement is properly dried, roll the splice together and smooth it into place with hand pressure, being careful not to stretch or wrinkle the membrane. Then immediately roll the splice with a metal hand roller.
 3. Wait a minimum of two hours, and no more than the next working day, before applying the lap sealant. Make sure that any splicing cement applied beyond the edge of the seam is cleaned off the area where the lap sealant is to be applied.

ALTERNATE FLASHING METHOD FOR HYDROGEL GEL-FLEX WATERPROOFING SYSTEMS

In those instances where the flashing needs to be installed and a **Hydrogel** melting unit will not be able to be brought on site for some time (i.e. curtain wall installation is proceeding and the roof curb below needs to be flashed) Kingfield's cold-applied liquid membrane, **Turboseal**, may be used in lieu of **Hydrogel** to seal-in the **Duroflex**.

The **Duroflex** must be adhered to the vertical surface with bonding adhesive, starting at a point 3" off the deck and then up the full height at which point it must be properly terminated.

The 3" of unbonded **Duroflex** on the vertical and the 3" that extends out onto the deck must be firmly embedded into the **Turboseal**, applied at a thickness of 80-90 mils. The **Duroflex** must be set into the membrane so that no air pockets develop and it must be set tight into the corner so that no bridging (voids) is evident behind the flashing. The cold-applied **Turboseal** membrane should be allowed to set slightly, 2-4 hours, prior to embedding the **Duroflex** flashing membrane. The horizontal portion of the flashing should NOT be encapsulated with additional cold-applied liquid membrane. The exposed **Duroflex** will eventually be covered with **Hydrogel** when the rest of the membrane is applied.

*For any other alternate flashing, besides those described above, Kingfield must be consulted on a job-to-job basis.

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