

Geomembrane Liner & Oil Filtration Panel Containment System Installation Process



Installation of Liner System

Important Notes:

The steps in below are ordered as recommended by the manufacturer. Depending on the size of the installation crew, some of these steps can be done simultaneously.

Product Storage

The Geomembrane Liner and Oil Filtration Panel System should be stored in a covered area prior to use. Keep the product on its shipping skid. Remove the adhesive and store at temperatures above freezing (32°F or 0°C). Moisture can compromise the integrity of the supplies.

When choosing an installation date, take into consideration the temperatures at which the companion products work their best, i.e., vinyl adhesive, vinyl cleaner, etc. Installation should be performed in weather that is above 32°F (0°C) and below 100°F (38°C).

Layout of Containment System

Each containment unit is unique and custom built for the site. The system will arrive in pre-fabricated panels; the corner panels will also be pre-fabricated at the factory. Each panel will be marked and must be laid out according to the site plan. All panels should be properly laid and adjusted prior to beginning assembly. The panels need to be properly aligned so that there is a minimum of a 2" overlap at each seam. Panels are generally pre-cut with extra vinyl and may have more than 2" overlap when properly aligned – extra material can be trimmed on site and kept for patching corners and making field boots.

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1. **Prepare the site for the installation. The excavation must be completed prior to the arrival of the installation crew.**
 - a. The containment area needs to be over-excavated a minimum of 24" on all sides to accommodate for freeboard outside the geomembrane containment unit on all sides. This will provide the necessary amount of gravity for adequate drainage and allow for proper backfill of clean, washed stone.
 - b. The depth of the excavated area needs to be a minimum of 6" deeper than the floor of the containment unit. This additional depth will be filled with washed pea gravel to function as a leach field, assisting in the displacement of water. The pea gravel floor should be sloped from the center to the outside to promote the flow of water out of the containment area.
 - c. Clean the transformer pad and existing piers side walls to make sure they are free of dirt before applying the reef tape. The transformer pad must be dry – the reef tape will not adhere to wet or surfaces.
2. **Mark the sidewalls of the transformer pad, piers and walls according to drawings before applying reef tape**
 - a. Snap a chalk line across the pad to maintain proper wall height.
3. **Apply reef tape as marked to all sides of transformer pad as required**
 - a. Roll the reef tape with a roller against the pad walls to assure a tight bond
 - b. Do not remove paper from tape until ready to attach liner
4. **Using the site plan drawings, measure and mark the floor of the containment site with marking paint to get the proper orientation of the panels and transformer pad. Be sure that the gray portion of the liner is facing to the outside of the containment area.**
5. **Unfold the liner and position the panels inside the containment as indicated on the containment layout drawing**
 - a. Position end panels (A & B) which normally go from corner to corner first, assuring proper fit into the corners
 - b. Position side panels (C& D) so there is a 6-inch overlap at each end of the transformer pad to properly seal the system at the corners

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TIP: Work as two-man team when seaming to keep seams straight and free of wrinkles.

6. Measure, mark and fit each panel around any piers within the floor of each respective panel
7. Attach the liner to the transformer pad, beginning with panels A & B, followed by C & D
 - a. Strip protective paper off the reef tape
 - b. Press the liner into position against the reef tape. Begin attaching the liner in the center of the pad. Work toward the end in one direction at a time to avoid wrinkles. Bring the liner straight down to the floor to avoid liner coming away from the wall.
 - c. Use a roller to roll liner against the tape to assure tight bond
 - d. Position aluminum flat bar and attach to the side wall of the transformer pad, drill quarter inch holes into the concrete and use 1¼-inch Hilti KWIK-CON II + Torx hex head concrete anchors to secure the liner to the transformer pad
 - e. DO NOT attach the aluminum flat bar to the pad at the corners until the seaming of the liner at the corners has been completed
 - f. Trim excess liner material at the top of the flat bar
 - g. Remove any concrete dust from the drilling process before caulking the top
 - h. Caulk the top of the flat bar to the transformer pad for additional seal
8. Begin seaming the panels after the liner has been attached to all four sides of the concrete foundation pad. ***Work as a two-man team when seaming to keep seams straight and free of wrinkles***
 - a. Mark and trim the panels to a minimum of 3-inch overlap before beginning to seam
 - b. Seal the vertical seams of the panels at the corners on the transformer pad; drill the final anchors and fasten to the pad
 - c. Be sure the liner is flush against the bottom of the pad to insure there are no gaps between the liner and the bottom. Bring up the liner to the reef tape.
 - d. Begin seaming the panel at the base of the transformer pad, crossing the floor to the end of the panel on the outside
 - e. Clean and dry the panels during the seaming process using a rag and cleaner provided. Clean both surfaces of the overlapped material to ensure that the seam is free of dirt and will properly seal.

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TIP: Some like to outline the pier on the panel and then cut about an inch inside the lines. If done correctly, this creates a slight flap that rides up the wall, helping to ensure a better seal at the floor when the boot with floor flaps is added.

8. Continued

- f. Use only the adhesive provided (HH66) to seam and seal the floor panels. Apply a light, even coat of adhesive to both panels. Allow the adhesive to get tacky (not wet) and work the adhesive back and forth several times to obtain an even coating of adhesive. Then position and seal with a roller, applying pressure over a wooden plank beneath the floor to ensure proper sealing.
- g. Inspect all seams to ensure the edge is properly sealed. If there are wrinkles in the seam, make a round patch to cover and seal them.
- h. After inspection, seal the entire seam with a rubber sealant (such as Flexseal or similar) to further assure a proper seal.

9. Corner, single patching

- a. After the panels are seamed and sealed, install a pre-formed corner to the base of each corner of the pad, where the panels have been joined
- b. Using a silver permanent marker, draw the outline of the corner
- c. Using the HH66 adhesive, brush a 4-inch wide strip of glue to the inside of the outlined corner.
- d. Repeat to the inside of corner. Adhere corner and press into place with roller.
- e. Apply multiple applications of the rubber sealant to all seams to assure maximum sealing protection

10. Existing piers, retrofit

- a. When retrofitting an existing site where steel supports are already in place, measure and mark where to cut around the piers. Figure out which side has the shortest distance to an end of the panel, and cut that line so the cutout lays around the pier and then comes back together on the side cut through to the end. Wrap reef tape around the pier at the desired height in order to attach the vinyl to it. Patch the cut in the floor and boot the pier. Metal aluminum bars should be bent and attached to secure the liner to a round pier.

11. Boot piers and penetrations through the floor of the liner

- a. Boots must be custom fitted to the precise size of the pier and/or conduit on site utilizing preformed factory boots or material trimmed during the liner floor installation
- b. Take measurements of the pier to make a vertical boot and attach to the pier or conduit with reef tape

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11. Continued

- c. Measure the size of the pier (Example: 36-inch diameter pier has a radius of 18-inches)
- d. Bring the folded liner up to the pier and measure out half the size of the pier (18-inches)
- e. With an 18-inch string, draw the diameter of the circle on the liner. This will make a 36-inch diameter circle.
- f. Cut just to the inside of the line and cut straight out to the closest edge of the liner, wrap around the pier
- g. Secure the bottom of the boot with a 3-inch overlap on the floor liner. Glue each flap and seal to the floor liner with adhesive. Using the roller provided, roll seam while applying pressure for a tight seal.
- h. Position a 4- to 6-inch wide vinyl seal at the base of the boot, sealing to the floor to cover the base of the boot
- i. After the boot is fitted to the pier or conduit, seal all seams again with a rubber sealant
- j. Band each pier at the top of the boot with aluminum strips. Use sealing compound to further seal the liner to the pier.
- k. Seal grounding cable penetrations at the top of the liner against the transformer pad wall, using a sealing compound to seal the penetration. Seal again with a rubber sealant.

12. Staking the outside oil filtration panel walls

After all the seams, pads/piers, conduits, ground cables, and drain pipes have been sealed and/or booted, it is time to stake up the outside walls. Using (2" nominal) wooden stakes is the simplest method. Begin in the corners and place a wooden stake every 2 ft to 4 ft to support the vertical position of the wall. Raise the outside wall and attach to the wooden stake with deck screws $\frac{1}{2}$ " from the top of the wall. The stakes can be left in place or removed after the containment has been backfilled with clean, washed stone, to the grade depicted in the site drawings.

- a. Beginning at the pre-fabricated corners, place wood stakes approximately every 2 to 4 feet along the outside containment wall.
- b. Lift the outside wall into a vertical position and attach it to the wood stake with $\frac{3}{4}$ " deck screws or staples. Staple or screw $\frac{1}{2}$ " from the top of the Oil Filtration Panels to prevent damage to the panel.

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13. Cover the entire floor of the containment with geotextile material (15-ounce) prior to being backfilled with stone

Access to the oil containment unit may be limited due to surrounding structures. Place the clean, washed stone (gravel or round) in the unit in a manner that limits the impact of the stone on the floor on the containment unit. We require clean, washed stone of average size from $\frac{3}{4}$ " to $1\frac{1}{2}$ ", free of dirt or fines. When backfilling the area along the outside walls, maintain an equal level of stone on both sides to prevent the stone from affecting the position and alignment of the wall, and to prevent the liner from being pulled off the stake.

- a. Cover the floor of the containment with geotextile fabric, cutting to fit along the perimeter walls and around pads/piers. This acts as a protective barrier for the liner during backfilling procedures.
- b. Starting at corners, begin placing clean, washed stone into the containment area in a manner that maintains equal amounts of stone on both the inside and outside of the vertical containment wall. Try to prevent the stone from affecting the position and alignment of the containment wall. A ripped length of PVC conduit can be used to keep the wall from being crushed.
- c. Continue placing stone around the perimeter to the designated height according to the site drawings. Then begin filling from the perimeter toward the center.
- d. Finish placing clean, washed stone, until the stone has filled the site back to its desired grade.

The Importance Of Clean, Washed Stone

The importance of using the correct stone cannot be understated. Stone must be CLEANED, WASHED, and free of dirt and fines. Dirty stone WILL compromise the flow rate of the Oil Filtration Panels. Stone with a lot of fines WILL reduce the percentage of void space and compromise the containment capacity.



Finished To-Grade Containment



Finished Dike Containment



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