Spider Tie "Wet"

Pool installation instructions

Building a swimming pool may seem to be an overwhelming project. But it doesn't have to be. Like any building project, it's just several very simple steps done in the right order. After watching our step by step instructional video, reading and following our step by step written instructions with illustrated drawings, you should have enough information to successfully build a beautiful in ground swimming pool. Be sure to review all the instructional information before starting your project. **(Please read disclaimer at the end of these instructions)**

Since the Spider Tie "Wet" pool wall system is built out of concrete, installed correctly you can expect a life span that is more than double that of most steel and polymer wall systems.

Step 1

Planning

Establish where you want the height or finished elevation for your pool deck to be. Make sure that all water runoff drains away from the pool and away from your house or any other buildings. Once that is established, mark out the location of the pool in the yard. Choose a sunny area avoiding underground and overhead wires, pipes and septic systems.

For patios, locate in an area where downspouts from your house or other buildings will not interfere with pool or new patio

Locate filter equipment as close to pool as possible keeping in mind the necessary electrical and backflow plumbing.

Consider what trees, landscaping and fences may need to be temporarily removed to gain access to your site with excavating equipment.

Equipment and tools needed

- Backhoe and operator (to excavate hole for pool)
- Transit or laser level (rented)
- Shop Vac or industrial vacuum cleaner (rented)
- Wheel barrows (rented)
- Sledge hammer (rented)
- Shovels, rakes and picks
- Steel plastering trowels (pool trowel)
- Cordless impact drivers and #2 Phillips bits
- (2)- 100' "steel" or "fiberglass" measuring tape
- Electric circular saw and extension cord
- Hand saw, string, ground spray paint, tape measure, chalk line
- Hammer
- Electric ¼" or larger drill and required drill bits
- Adjustable pipe wrench

Step 2

Staking out pool location

The stake out dimensions for vinyl liner pools are 2'6" greater around the perimeter than the finished pool dimensions. This additional 30"provides a ledge in the deep end the same level as the shallow end, and ensures a solid base for the perimeter footing that the Spider Tie "Wet" concrete walls sit on. It also allows ample room to work while forming the footings and walls.

Note: All Spider Tie "Wet" models should be checked for square by measuring the diagonals. If the diagonal measurements are equal your pool will be square.

Follow the dimensions on your "Dig Sheets" for laying out your pool. Remember to add the additional 2'6" around the outside of your finished pool dimensions to ensure the correct measurements for excavation. (For example if your pool is a 16' x 32' pool your hole will be 21' wide by 37' long) Be sure to excavate an area

large enough for your pool steps if the design shows them outside of the pool dimensions as in the case of fiberglass steps.

Step 3

Excavation

Have the backhoe operator study the excavation dimensions of the detailed plans. Make sure he understands the close tolerances for the pool walls and inside finish. An accurate job will simplify your work.

Select a level for the finish grade of your pool. Set up transit or laser level far enough away from dig site as not to interfere with the backhoe or trucks removing unwanted dirt (level should not be removed until excavation is complete). Add the desired depth of your pool (in most cases it is either 42" or 48"plus 2" for the vermiculite floor) to the established mark of the finished grade. You now have established the grade for the shallow end and footing ledge around deep end. This level should be checked frequently as excavation progresses to eliminate unnecessary hand digging.

While the hole is being formed, a man with a pick and shovel should work within, directing the backhoe operator, grading and making periodic checks of all measurements.

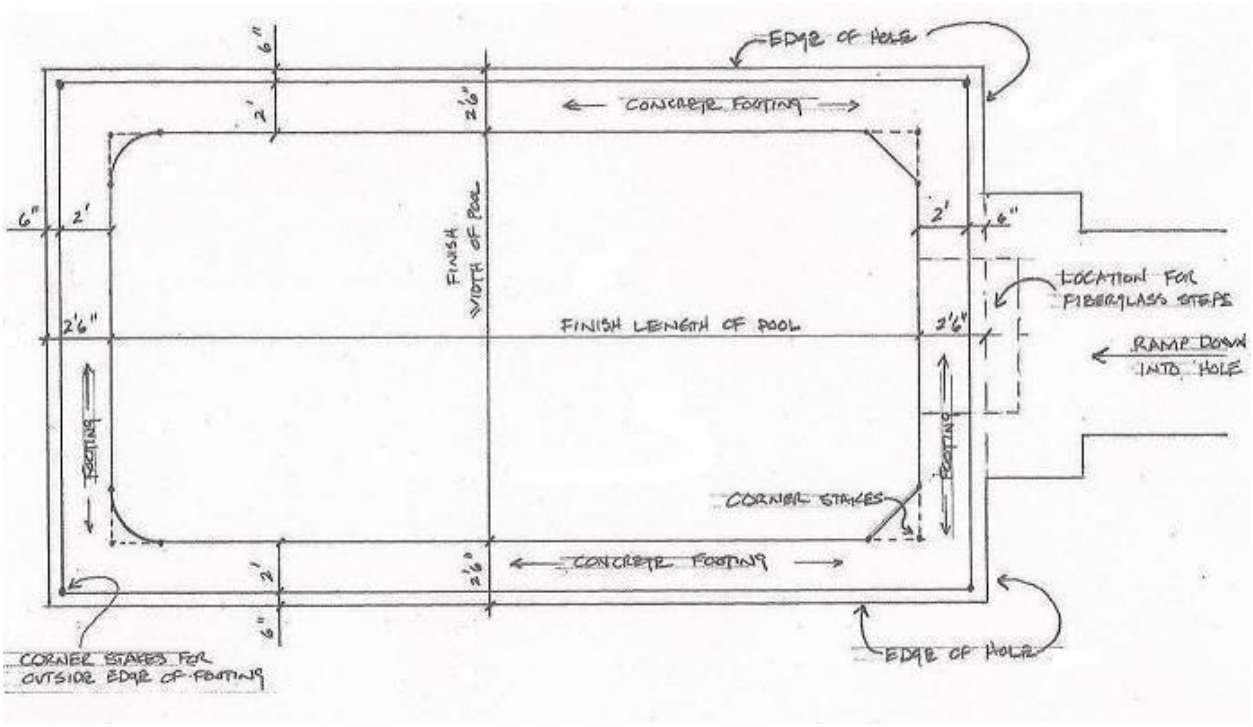
Note: Do not dig the hopper for the deep end until after the concrete footings have been installed.

Step 4

Footing layout

At this point your entire hole should be at the desired depth of shallow end and the surface should be completely level. It's now time to lay out for the footings. The inside edge of footing will be the same as your finish dimensions of the pool.

Start by laying out pool again inside the hole. Remember that your lay out starts 2’6” in from the dirt wall all the way around. If your pool has radius corners you only have to form radius in the deep end of the pool. In the shallow end you will provide a 45 degree corner- (see detail 4A, this detail uses a 2’ radius as an example)



Detail 4A

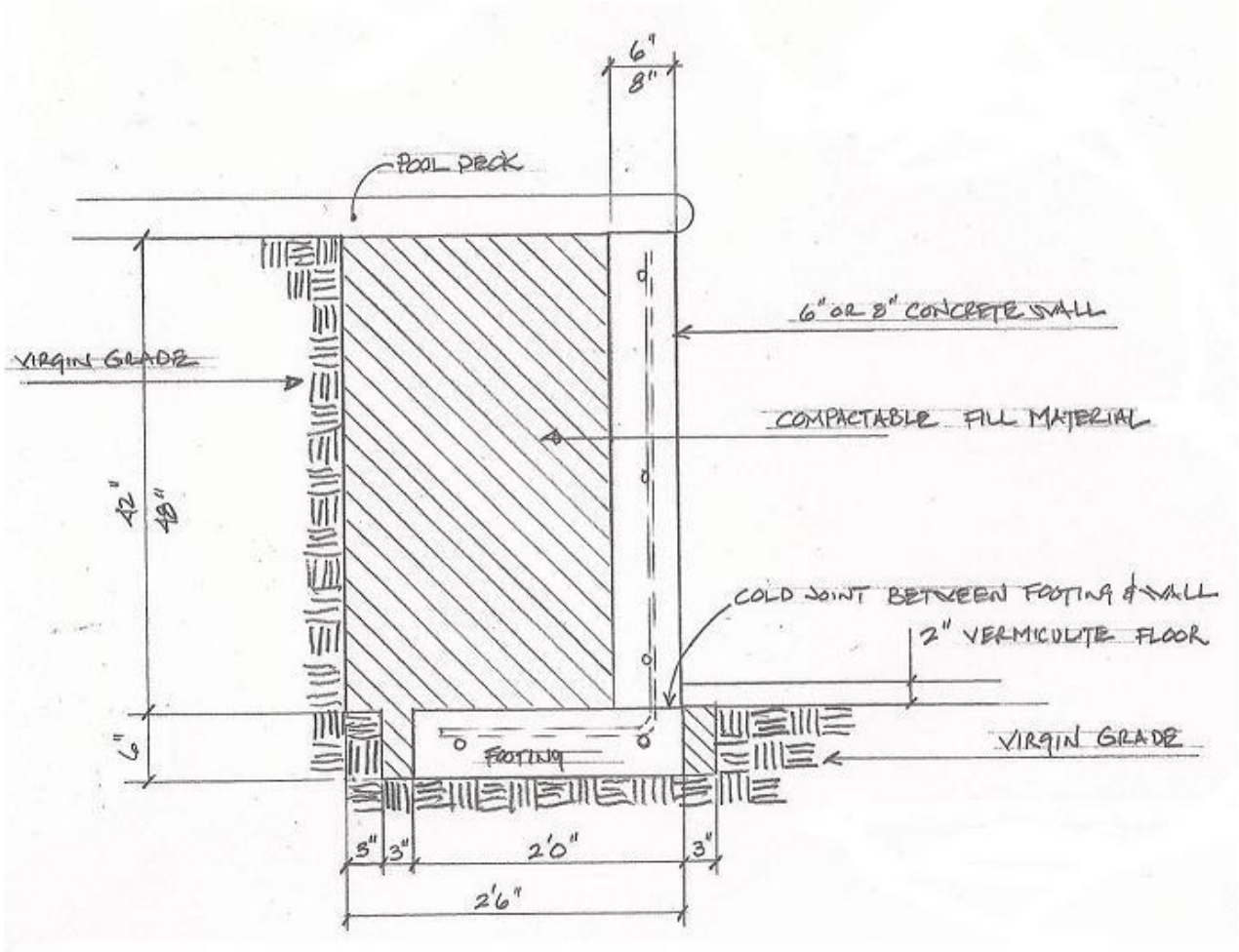
Once you have marked out the footings, have the excavator dig the footings 6” deep and about 2-3” wider on both sides of the footing to give you extra room for your form boards. You may need to clean up the footing trench by hand after the excavator ensuring ease of forming for the footings

Step 5

Forming footings

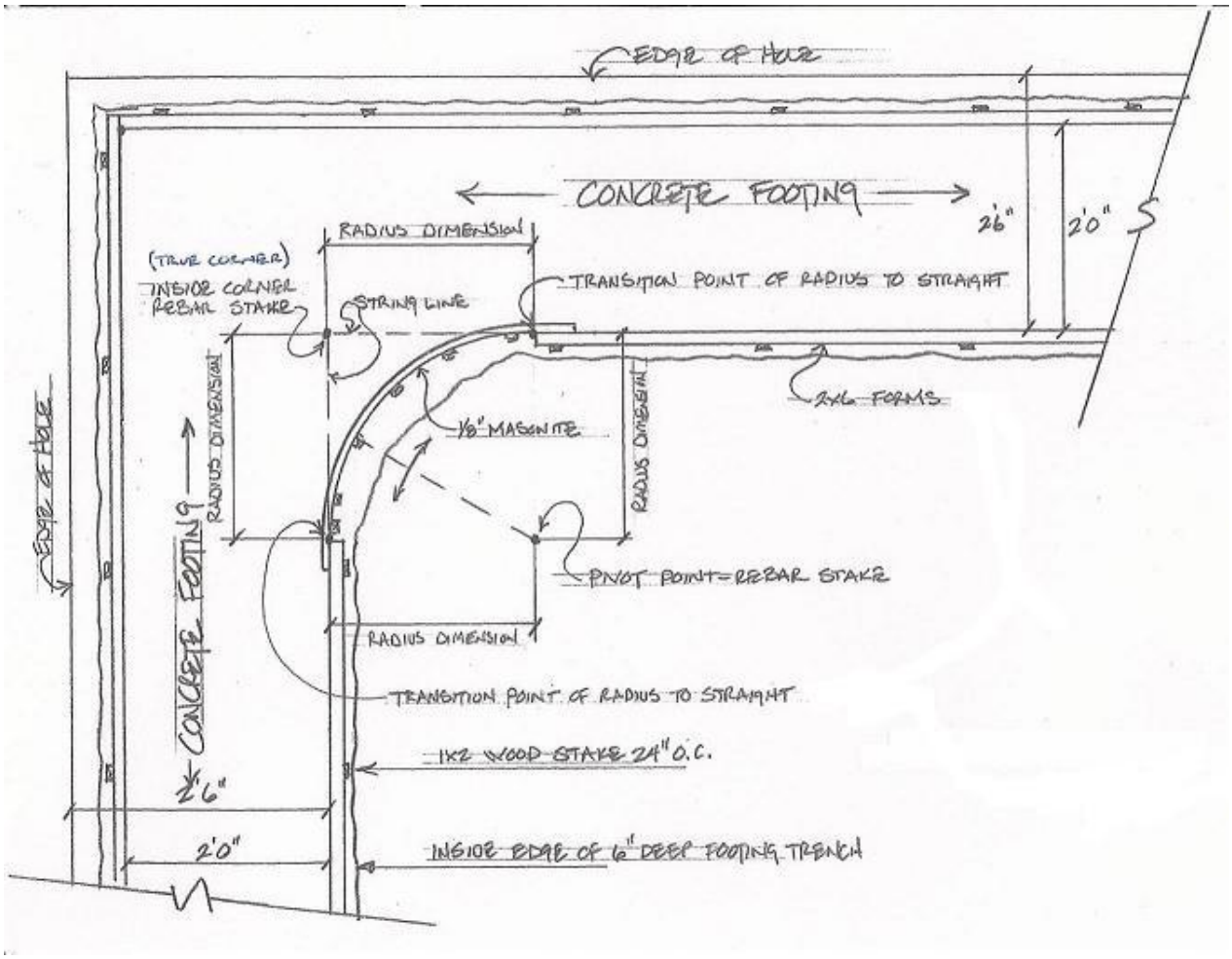
Note: It is very important that your footings end up level and the overall pool is square. For level, regularly check level with a transit or laser level. For square, make sure that your diagonal measurements remain the same throughout the process.

When complete you will want the top of footing to be level with the dirt (or established “shallow end” depth). Relay out pool once more. Again, remember the inside edge of your footing is the same as your finish pool dimensions. Try to form accurate radius corners in the deep end of the pool (see detail 5B). This will make it easier when digging the hopper later. This will eliminate any unwanted concrete from the footing when forming the hopper. The radius corners in the shallow end may be formed as 45 degree corners. This poses no problems since the finished floor will be poured 2” above the cold joint of the footing and the wall. (Detail 5A)



Detail 5A

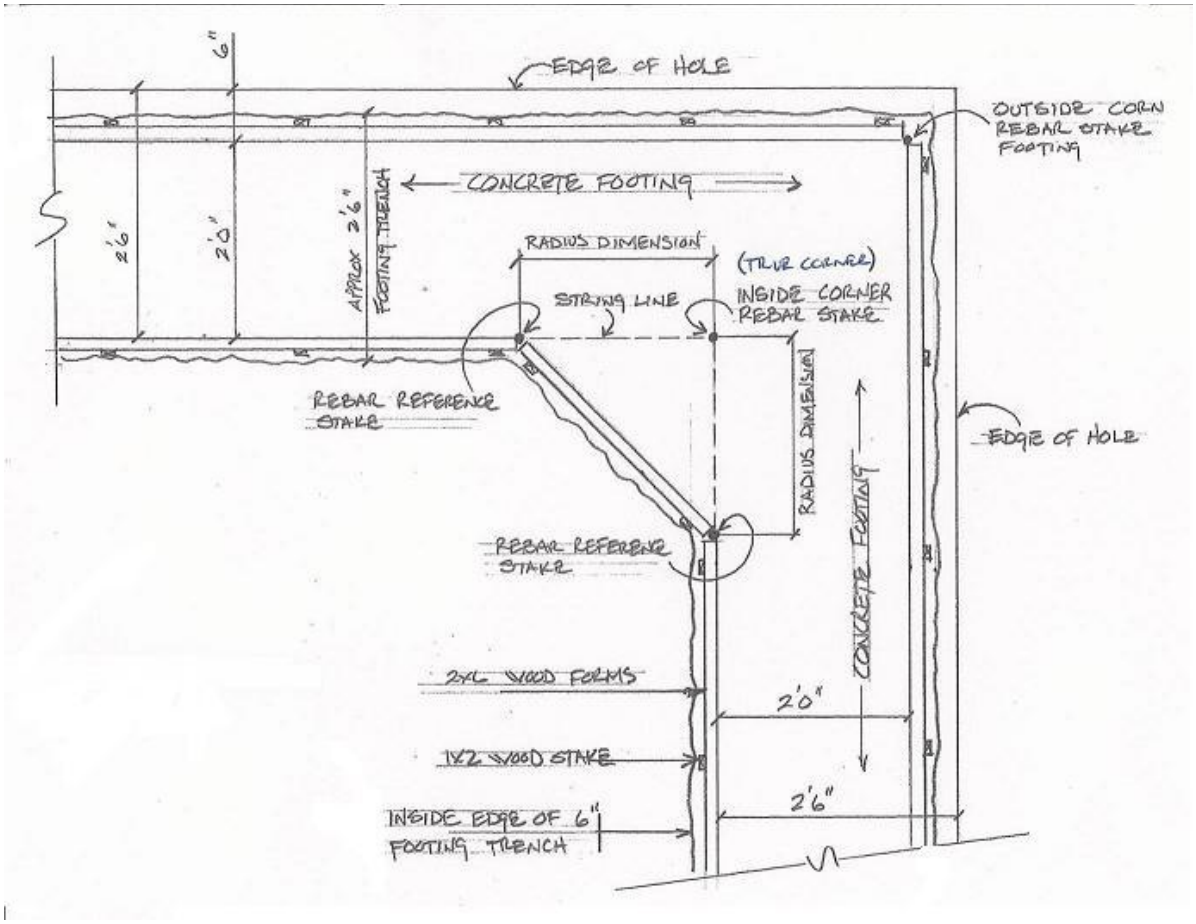
All form boards must be placed to the outside of your established footing location. It's customary to pull a string to mark out shape. Use a piece of rebar for a stake at all your corner locations. To establish where your radius starts and finishes in the deep end. Measure back both ways from the "true" inside corner mark or rebar stake, the dimension of the radius and drive another set of rebar stakes (transition points). From these marks measure out into the pool area forming a square, drive another rebar stake. You should now have 4 rebar stakes creating smaller squares at each corner. This 4th stake will become your pivot point to create your radius (Detail 5B).



Detail 5B

Note: if you received a radius template with your Spider Tie "Wet" wall kit, you may eliminate these additional steps and use the template to layout your radius corners for the deep end.

On the shallow end of the pool simply measure back from the "true" corner, the dimension of the radius and drive a rebar stake at both locations (reference rebar stake). Forming a 45 degree corner is faster and easier (Detail 5C).



Detail 5C

Now that you have established the shape of your footings it's time to establish the finish height. Using a transit or laser level mark all of your stakes using a permanent ink marker. The top of your footings should be level with dirt floor of the pool. Reset your string line at the ink marker line that so that it represents not only the line of the footing but the level as well.

Note: For now pull your string at 45 degrees at the two radius corners in the deep end.

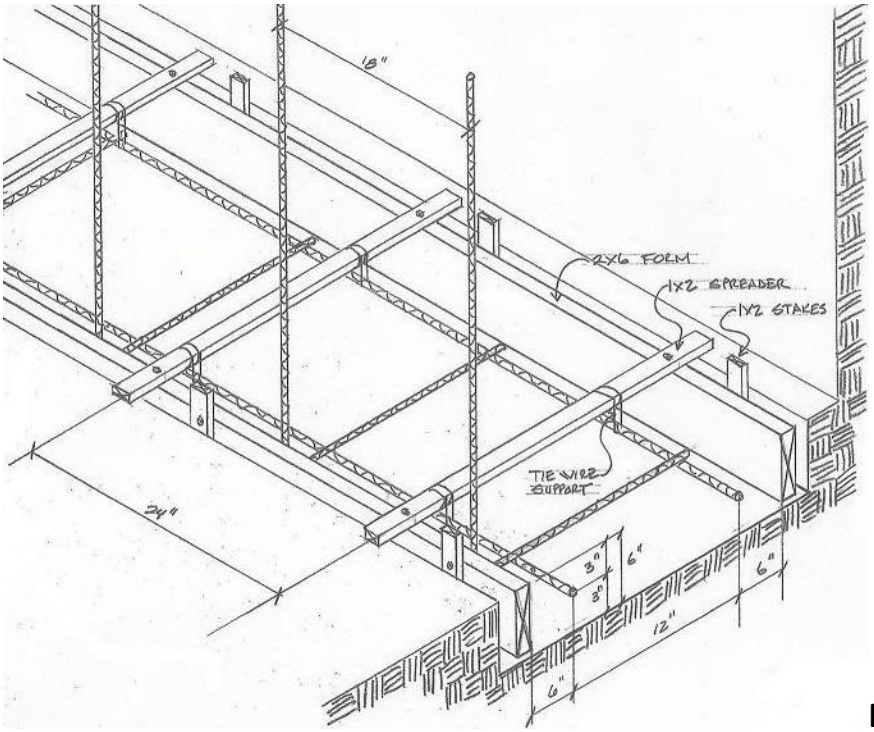
Measure out from your string the thickness of the forming boards you intend to use and drive a wood stake every 2'(example: measure ¾" for 1x6 form boards or 1 ½" for 2x6 form boards). Continue all around the inside and outside of the edge of footings. For the radius corners drive a stake every 6"right along the radius line. Do not allow for form thickness (see detail 5B). Cut and fit your forms all the way around. Save the radius corners for last. Raise the forms until the top of the form board is level with the string. Be careful not to lift the string with the form boards causing the string to be out of level. It's all ways best to keep the form board about a 1/16th to a 1/8th of an inch below the string. Using your cordless impact driver, drive a 2" deck screw through your wood stakes into the form boards to secure forms to the stakes. For the 45 degree corners in the shallow end cut a 2x6 the width of the opening. It is not necessary to cut 45's on the end of the form board. Remember none of this will be seen (See Detail 5C)

Rip a piece of 1/8th inch Masonite 6" wide and bend it to fit the shape of the radius. Allow an additional 3 inches on both ends. Fasten the Masonite to the inside surface of the straight section of the form boards at both ends. Yes, your radius will be in to far by a 1/8th of an inch but we will adjust for this later when we begin to form the walls. (See detail 5B)

Step 6

Footing Rebar

Cut and gently screw 1x2 by 30" long spreader boards across forms every 3'. These spreader boards not only reinforce the forms but also provide a support for your (2) continuous pieces of rebar for the footing (Detail 6A).



Detail 6A

Always follow the code requirements in your area for rebar requirements. (Structural Engineering is available through your dealer) Depending on the code requirements you may be able to "wet set"* the vertical "J bars"** during the pouring process of the footings. If not, set and tie all vertical "J bars" ahead of time.

*"wet set" means placing vertical "J" bars in place immediately after forms are filled with concrete while the concrete is still wet.

** "J" bars are the vertical rebar that are bent to look like an "L". The horizontal section is embedded into the concrete eliminating the chance for the rebar to pull out of the footing later when under pressure.

Note: Be sure that the DRAIN LINE for the pool is installed below the footing before pouring concrete. Also, be sure that all ELECTRICAL BONDING has been addressed before pouring concrete.

Step 7

Pouring concrete footings

Using a minimum of a 2500 psi concrete fill your footing forms to the top. Screed off excess and trowel surface smooth (a smooth finish will make the following steps easier). Be sure that your vertical J-Bars are properly spaced and placed. Your vertical rebar should be spaced 18" apart and no further and within 2 ½"- 3" of the inside edge of footing.(For "J" bar placement in the radius corners use the masonite template provided. There a 2 large notches on the inside curve of the 2' radius template, use this as a gage for positioning the vertical J-bars.) This will ensure that the rebar ends up in the right place inside the center of the Spider Tie wall. **Note:** Be sure not to place any vertical bar in area of steps. If you do you will need to cut them off latter.

Once concrete has dried, remove all forming materials and store them outside of the immediate work area.

Step 8

Excavating the Hopper

Once the concrete has cured enough to be walked on, bend over just what is necessary of the vertical rebar so the backhoe can reenter the pool area to excavate the hopper in the deep end of the pool. The entry location is usually where the steps are going to be located, if this is the case then there will only be a few bars that need to be temporarily bent over. Be sure to refer to the "Dig Sheets" for proper excavation.

Note: It is recommended to cover the area of footing that the backhoe will be driving over with a dirt ramp. Cover the footing with enough dirt to protect it.

Once the excavation is complete, bend vertical rebar back to a vertical position and clean footing of any dirt that may have accumulated from the backhoe.

You are now ready to start the Spider Tie wall portion of the project.

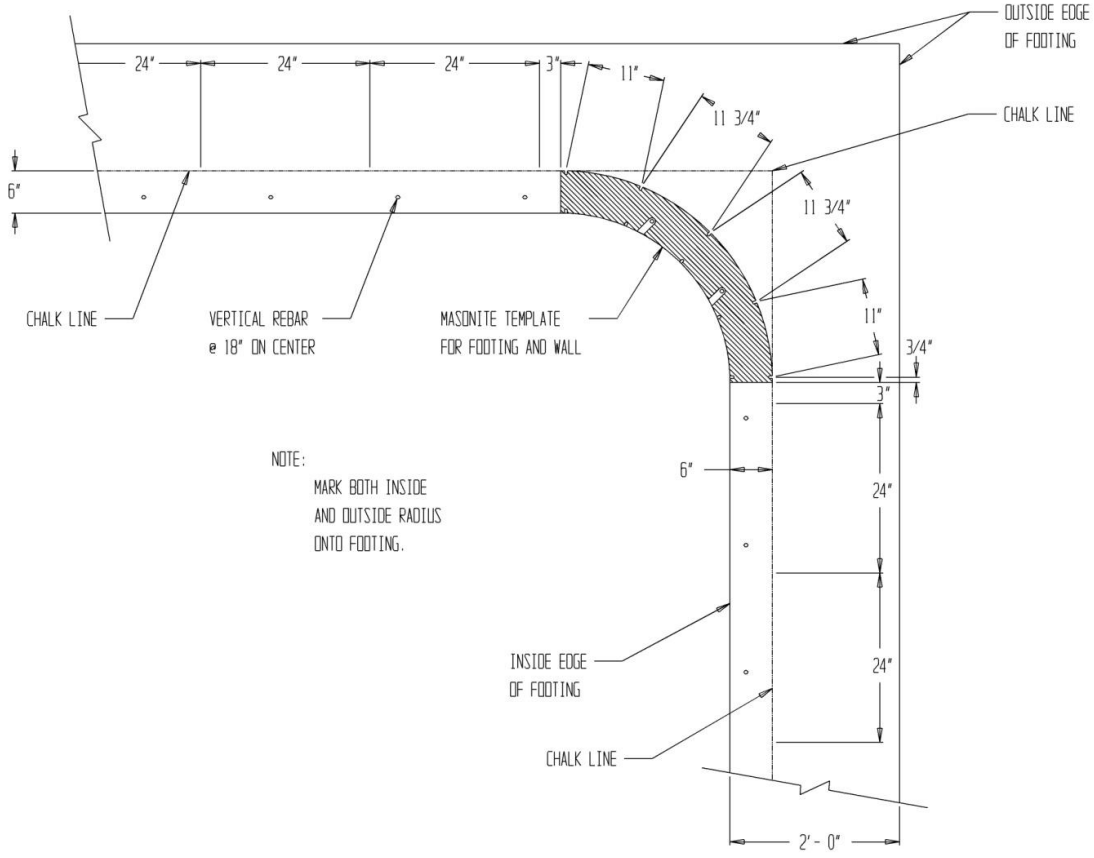
Step 9

Spider Tie "Wet" layout

(Only use Spider Tie "Wet" for pool applications)

There are 2 parts to the Spider Tie “Wet” system- the “Starter Tie” and the “Spider Tie”. The Starter Tie allows you to fasten the system to your concrete footing. The Spider Ties function like studs in a wall, creating a framework for you to fasten your plywood to. The spider tie system also holds the horizontal rebar in place.

To begin with measure out 6” (or 8” if you are using the 8” system) from the inside edge of the footing and make a mark at each end of all straight sections of your footing. Using a chalk line snap a straight line between marks. You will be using this line for your lay out. Using the Masonite template for radius corners that came with your kit, lay the template on the footing at the radius locations and mark the outside and inside curve onto the footing. Both ends of the template should connect to the straight chalk lines of the straight sections. You will notice that there are 5 small notches on the inside and outside edge of the template (the 2 large notches are for proper vertical rebar placement during the footing phase of the project). Make a mark on the footing at each one of those notches. This will be the layout for your Starter Ties. (Detail 9A)



Detail 9A

If your pools design has a fiberglass step system you must first place your steps in the proper location before continuing. See Step 15 for step preparation and placement instructions.

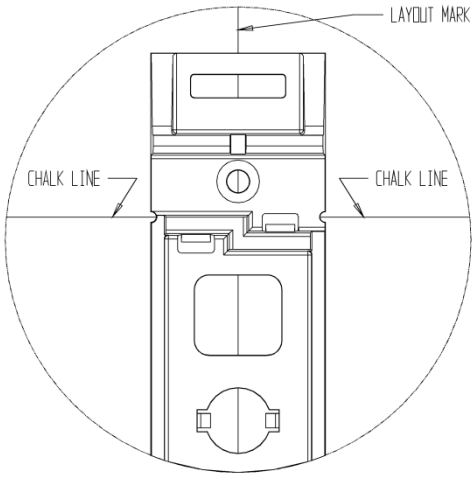
For all straight sections start by making a mark 3”in from the end followed by making a mark every 2 feet until you come to the other end. Then finish your lay out with a mark 3” back from that end. You should not have any spacing greater than 2’. The spacing of the Starter Ties for the radius is much closer. This is necessary to hold the thinner material to the curved shape of the wall.

Step 10

Spider Ties and rebar installation

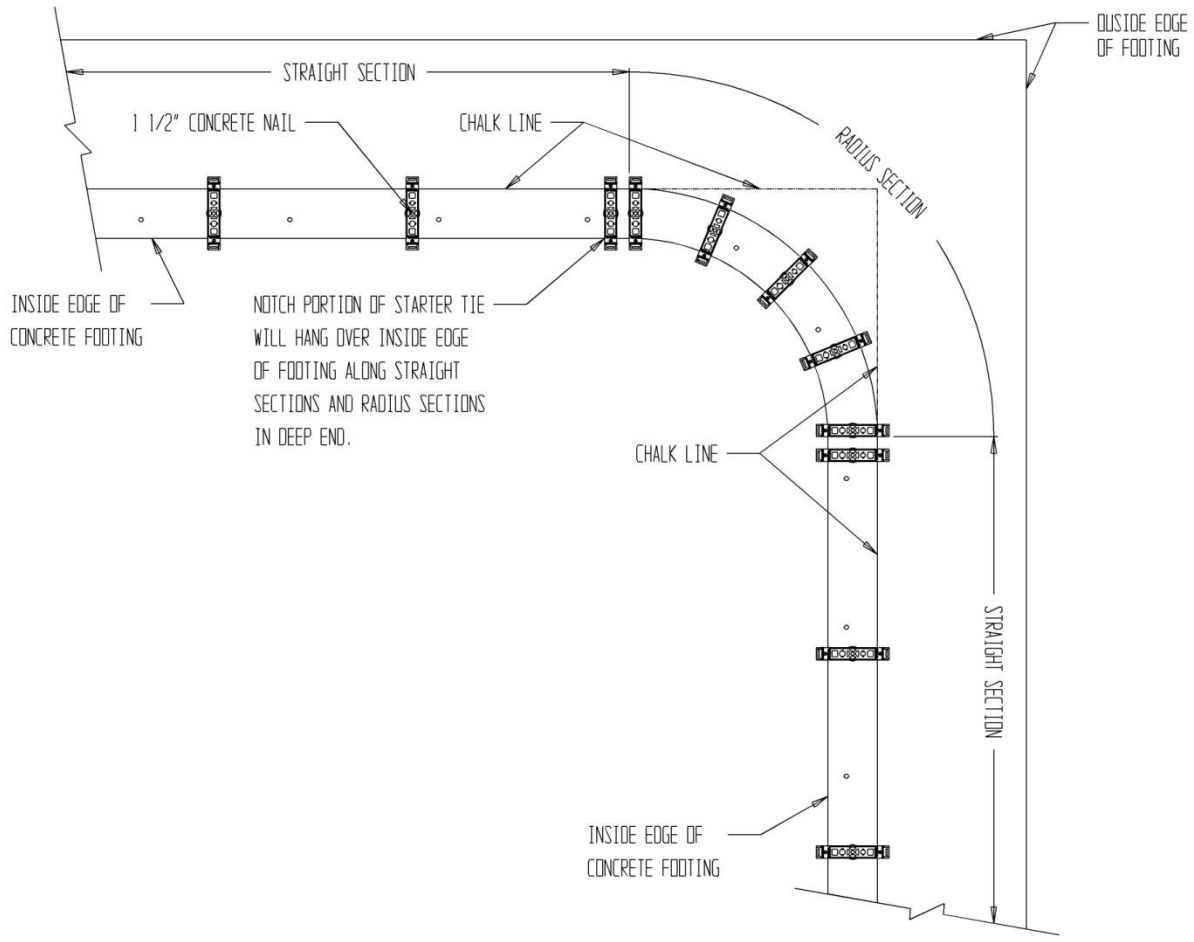
A 42” tall wall requires either 3 - #4 (1/2”) or 6 - #3 (3/8”) horizontal rebar spaced evenly apart and running continuously through the wall. You need to decide which type of rebar you plan to use. The erection of the Spider Tie frame and the installation of the rebar alternate back and forth until you have reached your desired height.

Start by nailing your starter ties to the concrete footing. You will notice a notch on the sides of the Starter Ties near each end and on both sides. Line this notch up with the calk line referencing the outside perimeter of the finished wall. Center the Starter Ties to your lay out marks. The starter Tie should be perpendicular to your calk line. (Detail 10A)



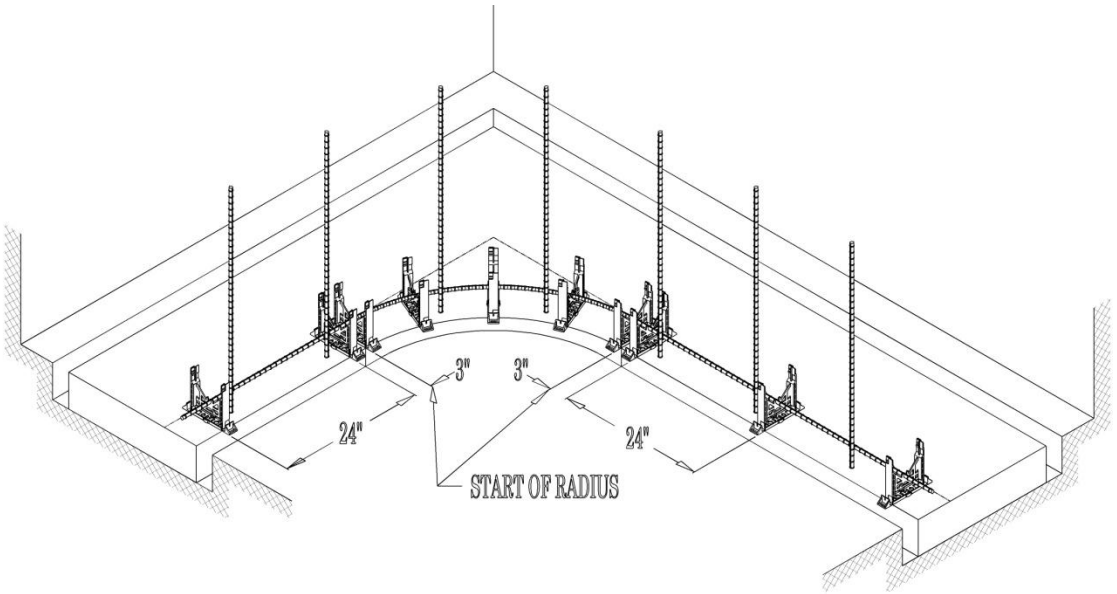
Detail 10A

The Starter Tie will be hanging over the inside edge of the concrete footing. Continue until all lay out marks have a Starter Tie. There are different ways to nail the Starter Tie down. If the concrete is new, most likely it will be easier to hand nail by using a 1”- 1 ½” concrete nail. Use the center hole in the Starter Tie for a nailing location. If the concrete is older or harder then it will be necessary to use a powder actuated tool or gun to nail the Starter Ties down to the footing .(Detail 10B)



Detail 10B

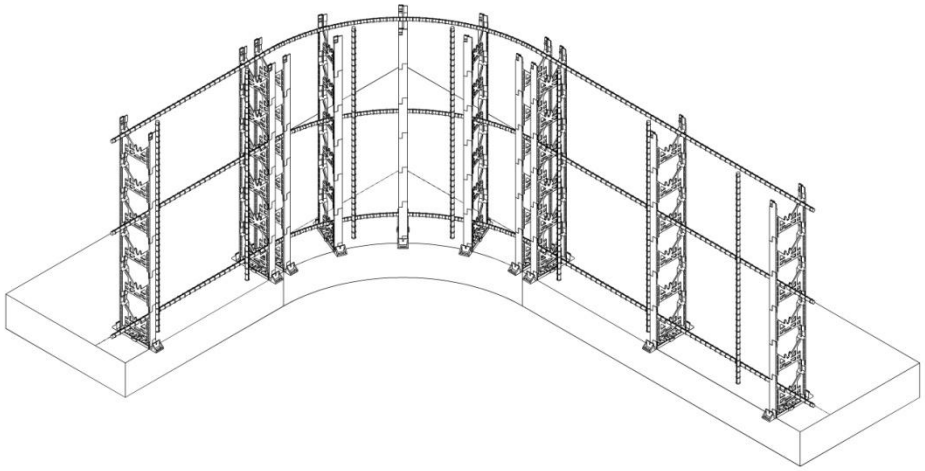
Once all the Starter Ties are fastened to the concrete footing proceed by snapping 1 - Spider Tie onto each of the Starter Ties. After that is complete install the first row of rebar into the center slot of the Spider Tie. (Detail 10C)



Detail 10C

Most codes require a minimum of 18” overlap on all rebar. At this time if your vertical rebar are not long enough to reach within 3” of the top of the wall, tie an additional piece of rebar to the existing bar to achieve the proper length keeping in mind the 18” overlap. Continue to build up the Spider Tie stacks and installing your horizontal rebar as you go. (Detail 10D) (These details show using ½” or #4 rebar)

Note: Refer to your building agencies bonding requirements for you rebar. Most agencies require all rebar to be bonded together with tie wire. The footings, walls and pool deck should be bonded together with a code approved bonding system.



Detail 10D

Note: Do not build the stacks taller than your next row of rebar

For 42” tall walls your Spider Tie stacks only need to be 6 Ties high

For 48” tall walls your Spider Tie stacks only need to be 7 Ties high

Step 11

Installing plywood

You are now ready to begin installing the plywood forms. For 6”Spider Tie system 5/8” OSB will work for walls 48” tall.

Note: When using 5/8” OSB or CDX it must be NEW and kept DRY prior to pouring concrete to work at its optimum, otherwise rated a “form ply” is always recommended.

Start installing the plywood on all straight sections first. Loose fit the plywood on both sides of the wall at the same time. This will require more than one person in order to do this. Do not fasten with screws right away rather use a Starter Tie at the top to temporarily hold the two sides in place. Do this by turning the Starter Tie upside down and clipping it to the top edge of the plywood. You only need one or two Starter Ties to hold each section together. Avoid having the ends of the plywood center on a Spider Tie stack. It will be much easier and stronger if the ends meet somewhere in between the stacks. Continue loose fitting all the straight wall sections. Be sure to be accurate when cutting the plywood sections to length. Do not allow the plywood of the straight sections to intrude into the radius sections.

Once all the straight sections have been fitted you may begin in a systematic order installing the screws through the plywood and into the Spider Tie stacks.

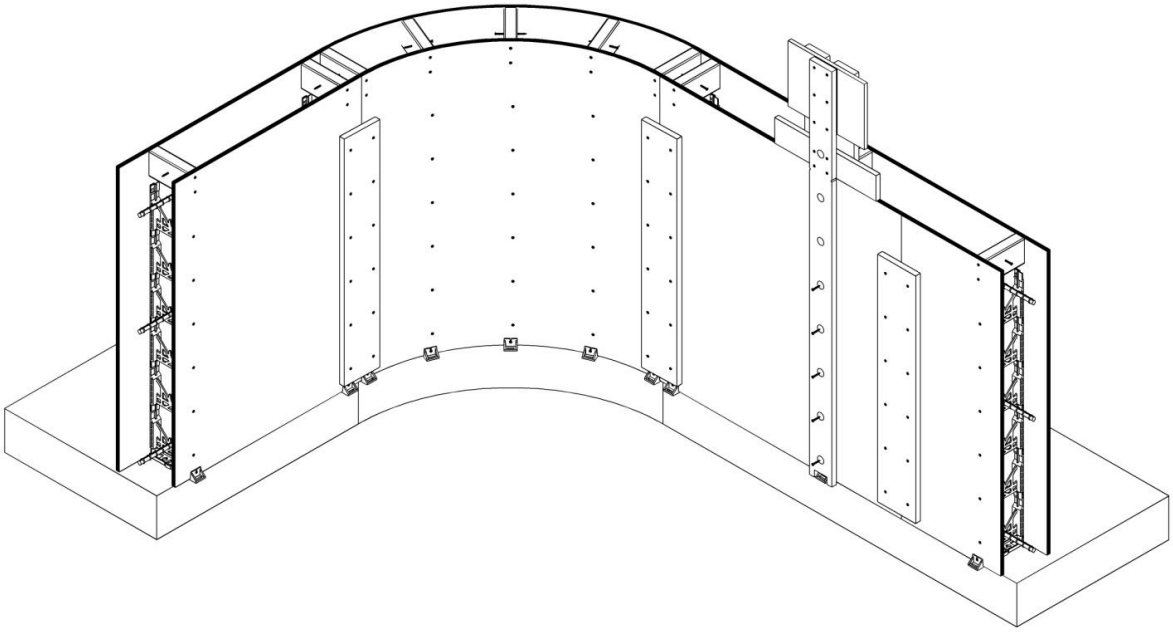
Step 12

Fastening plywood

It is always recommended to use an Alignment Tool to do this. The Alignment Tool ensures proper screw placement and shortens the labor process by as much as half. Your alignment tool will come ready to use with most ½” plywood. If the Alignment Tool does not easily slide into position, you will need to install the

spacing shims that come with the tool. Carefully remove the Hole Board from the Head Piece. Place the necessary number of shims between the Hole Board and the Head Piece. Be sure that when you reattach the Hole Board that it is properly aligned with the Interior Alignment Boards. Test the alignment tool. It should slide freely onto the Spider Tie stack. If it still is to tight add another shim.

Begin by sliding the alignment tool over the top edge of the plywood and down and over the first Spider Tie stack. The “Hole board” goes over the outside of the plywood. Look inside the first few times to make sure that the tool is properly positioned. (Detail 12A)



Detail 12A

Starting at the top 1st or 2nd hole using a cordless impact driver, drive a #10 - 1 ½” coarse thread screw until it begins to counter sink. Do not over tighten, risking stripping the screw. Repeat the process for each hole. Do not skip any holes. At the bottom there is a notch in the Starter Tie. Complete the row by placing a screw in that notch. Repeat this process for all Spider Tie stacks on both sides of the wall.

Step 13

Radius Corners

Cut a small strip of Masonite approximately 3” wide and 60” long. Place this strip into the starter Ties of the radius corners. But one end strip against the edge of

straight plywood section, bend into shape and make a mark where the strip meets the edge of the straight plywood section at the other end. This will give you the dimension or length you need to cut the first piece of Masonite. Repeat process for each layer and each side. Loose fit using Starter ties to hold forms together.

Note: 2 layers of 1/4" Masonite per side for 4' radius, 3-4 layers of 1/8"Masonite per side for 2' radius.

Attach with screws using the same process mentioned in Step 12.

Step 14

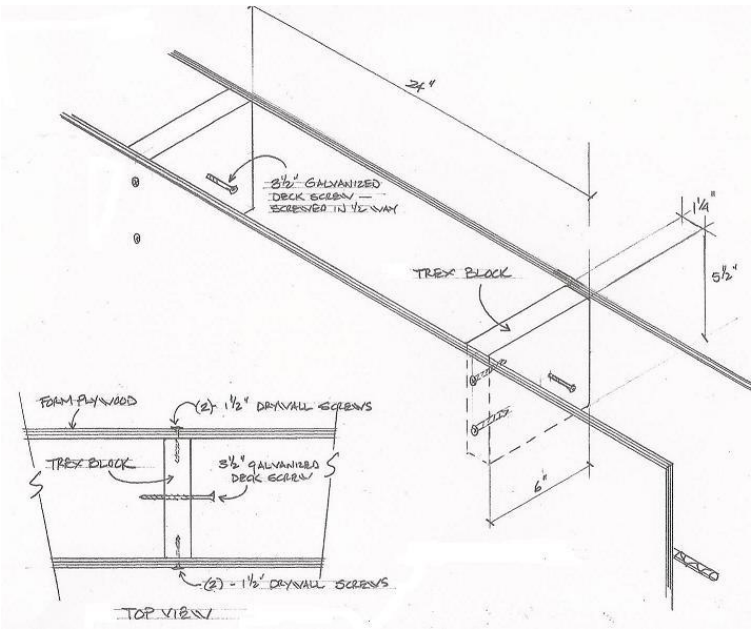
Finishing joints and Bracing

Cut several ½" plywood strips 6" wide and 42" or 48" long (depending on the height of pool wall). Attach these strips everywhere 2 pieces of plywood meet. Center strip over joint and place a screw (1 ½" drywall screws work well) every 6" down each side of joint. These screws should be approximately 1 ½" in from the edge on both sides of the strip. Do this also at the transition between the straight sections and radius sections. (See detail 12A)

To support the top of your forms and provide a fastening surface for the vinyl liner aluminum coping, use either pressure treated 2 x 4's or 1 ¼" x 5 ½" TREX blocks cut 6" long.

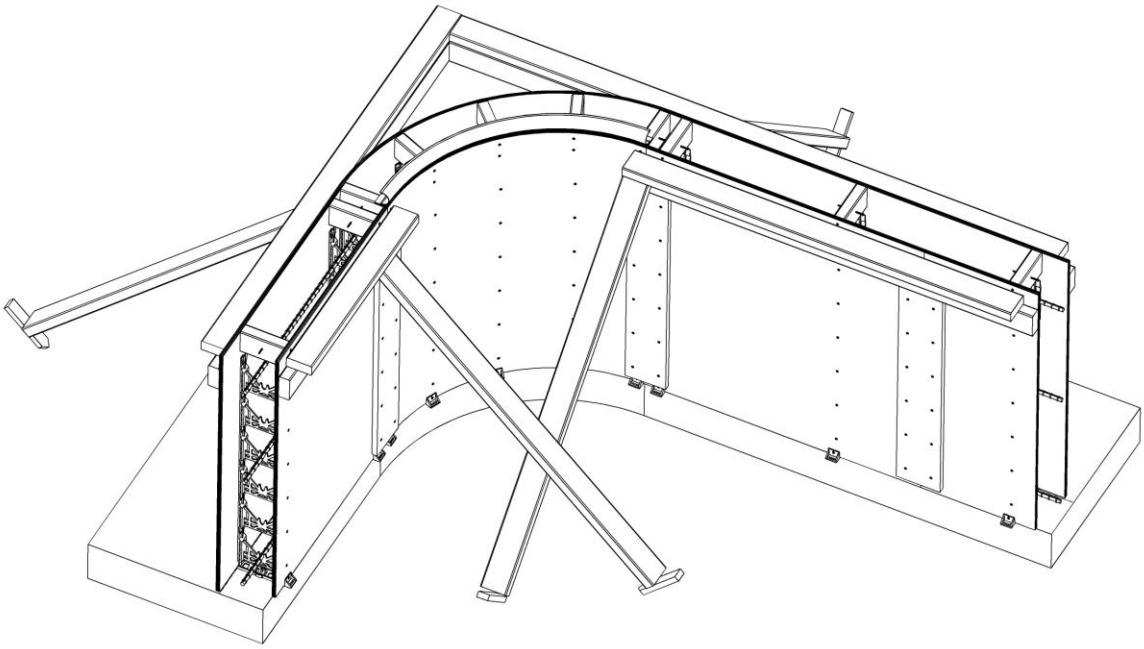
Note: TREX is the preferred material because it is less likely to shrink or split.

Install a block over the top of every Spider Tie stack including the stacks in the radius corners. Be sure that the top edge of the block is level with the top of the concrete wall. To ensure that the blocks do not loosen and move over time drive a 3 ½" deck screw through the center of each block until the screw is sticking out half way on each side of the block. Once the concrete hardens around the blocks, the screw will help lock the block in place permanently. (Detail 14A)



Detail 14A

Using a 4’ level, begin by checking the wall where the radius and the straight sections meet. Plumb the wall and brace on both sides. Using a string line, site straight sections and make adjustments so that the walls are straight. Provide proper bracing to hold walls in place. (Detail 14B)



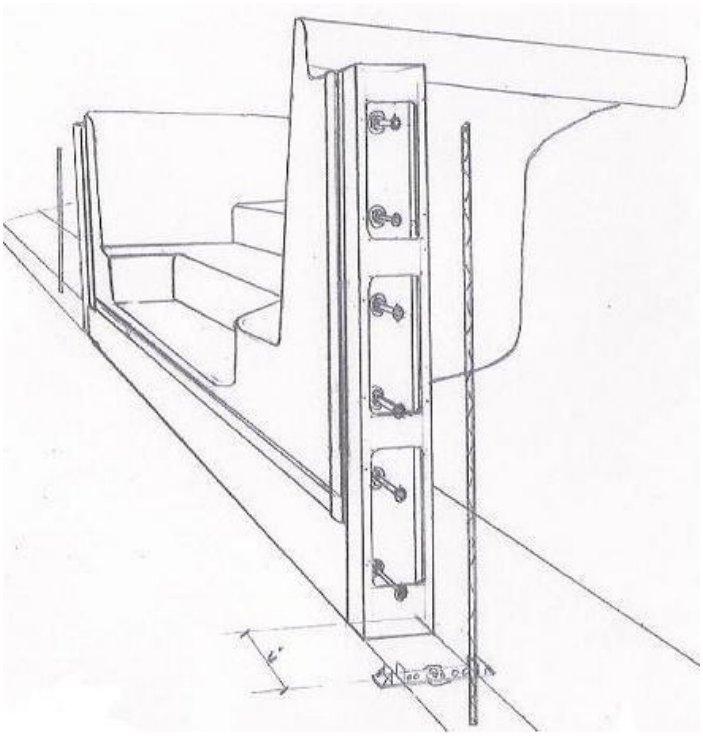
Detail14B

Note: If your kit comes with aluminum coping you will need to install the radius corner pieces of coping at this time. You will notice a small “lip” that extends down about a ¼”on the underside of the coping piece. Install the coping so that “lip” is wedged between the inside edge of the Masonite and the Trex or 2x4 blocking. Drive a “self drilling” 1 ½” Tech screw through the screw flange of the coping piece and into the blocking. Cover all areas of the copping that will be exposed later with duct tape to protect those surfaces during the concrete pour. Installing the aluminum coping ahead of time will ensure a proper radius at the top of the wall. This step is not required for vinyl coping, but before pouring concrete double check your radius corners by using the Masonite radius template that came with your kit. Brace corners accordingly.

Step 15

Steps and step preparation

In your pool kit your will find two 2x6 vinyl rail brackets 42” long. These brackets have three large rectangular holes cut out of one side. These brackets bolt to the sides of your steps using 4 ½” carriage bolts and serve two purposes. First they create a connection for your fiberglass steps and they provide a bulkhead at the end of the wall holding the concrete in place during the pour. (Detail 15 A)



Detail 15A

Begin by clamping the bracket to the mounting flange on side of the steps using three large “C clamps”. Position clamps near the center of each rectangular hole so as not to interfere with the required drilling process. The bracket must be flush with the steps on the pool side of the wall. The top and bottom of the bracket must be flush with the top and bottom of the mounting flange of the steps as well.

Note: The bracket must be flush with the surface of the steps not the liner gasket assembly.

Drill six 3/8” diameter holes through the bracket and the mount flange of the pool steps. Use caution not to allow the drill bit to extend beyond the space behind and into the main body of the steps.

Each bracket receives six 3/8” diameter carriage bolts 4 ½” long. Start by threading the first nut 1”onto the carriage bolt. Place a 3/8” washer onto the carriage bolt. Now insert the bolt into one of the 3/8” holes you drilled earlier. Place another washer onto the bolt from the back side followed by another 3/8” nut, hand tighten. The head of the carriage bolt should be extending beyond the cavity of the mounting bracket. The purpose for this is to provide a strong connection for the steps to your concrete wall. Once the concrete has been placed in the wall it will mold around the heads of the carriage bolts holding them in place. Repeat until all carriage bolts have been installed on both sides of the steps (See detail 15A). Double check the brackets so as to ensure that they are properly in place. Tighten the 3/8” nuts on the back side with a wrench.

Note: Be careful not to over tighten.

It’s now time to place your steps in the proper location. Refer to your pool plans and mark on the footing where the steps are to be located. Position steps accordingly. The mounting bracket must line up inside the wall on both sides of the steps. Temporarily shore up steps from underneath to ensure that the steps are properly level and plumb.

When laying out the Spider Tie stacks start your first stack 6” away from the steps on both sides.

Step 16

Plumbing and Lighting

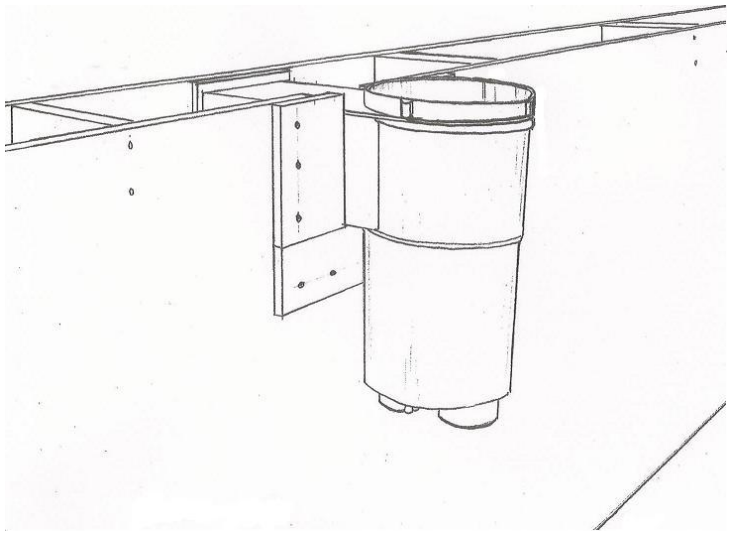
Refer to your plans for plumbing inlet and outlet locations. Once you have marked the locations on the plywood forms it's time to begin the installation process.

Skimmer- The top of your skimmer will be flush with the top of the concrete wall. You will need to cut away some of the outer plywood or the "dry" side (not the interior plywood form which we call the wet or water side of the wall) to make allowance for backside of the skimmer. Make the cut 2" wider than the throat of the skimmer and 2" lower than the underside of the throat of the skimmer.

Before installing skimmer duct tape the skimmer opening to protect the interior of the skimmer during the pouring process of the concrete.

Note: Do not install face plate onto skimmer at this time. The face plate will be installed at the time of the vinyl liner installation

Place skimmer in the forms with the duct taped skimmer opening tight to the inside of the interior plywood form. Using 2" drywall screws drive 1 screw through the plywood and into each of the two ears that are located on either side of the skimmer. On the "dry" side of the wall, cut and screw scrapes of plywood to cover the gaps around the backside of the skimmer. This will keep concrete from spilling out during the pouring process. (Detail 16A)



Detail 16A

Light Niche- Like the skimmer the light niche is deeper than the 6”thick concrete wall. You will need to cut just enough plywood away on the “dry side” or outer form to make allowances for the back side of the light niche. Unlike the skimmer the light niche must be installed during the forming process. Do not cut a hole for the niche on the “wet” side or the inner Form. Like the skimmer you will be placing the niche to the back side of the inner form.

Refer to the instructions that come with your light niche, mark the location on the “wet” side of the inner plywood form. Using the paper template provided mark the screw locations for the finish ring. Drill a ½” diameter hole at each of these locations. There should be 2 sets of screws that come with the light niche. The longer screws are for installation of the niche during the forming process.

Duct tape the opening of the light niche to protect it during the concrete pouring process.

Now use the finish ring to hold the Light niche in place by sandwiching the plywood between the two components. Be careful not to over tighten the screws.

Use small scraps of plywood to cover any over sized gaps that may have occurred around the back side of the niche that is extending beyond the forms to prevent concrete from spilling out during the pouring process.

Plumbing Lines- Refer to your pool plans. Mark locations onto both sides of the plywood forms and drill the appropriate size hole. Slide a 12” long piece of pipe through the forms. Be sure you end up with 2 ½”- 3” of pipe on each side of forms. Secure pipes with duct tape on both sides so the pipe is not able to slide out of position during the pouring process.

Step 17

Pouring concrete

There are several ways to place the concrete in the walls. If the concrete truck can get close enough to the work site, simply use the concrete shoot from the truck to

fill the walls. If the truck is unable to get close enough you will need to use a concrete pump.

There are two basic kinds of pumps. Grout pumps and Boom pumps. Grout pumps are much gentler on the forms and do not cause excessive hydraulic pressure. Boom pumps are easier to maneuver but can cause increased hydraulic pressure to your forms.

Note: When using a rated form ply hydraulic pressure is not as big of a concern. When using OSB or CDX plywood, greater care should be given when filling the forms in order to avoid "blow outs". This can be achieved by filling forms at a slower rate. Usually filling the forms half way then waiting a period of time until the concrete has had some time to firm up before topping the forms off.

A 3500 lb. psi "grout" mix offers the best results. The aggregate is smaller and the concrete consolidates easier. 5 ½" to 6" slump is best. The less water you introduce to the mix design the stronger the finish product will be. Less water also reduces hydraulic pressure.

External vibrating using a rubber mallet on the outside of the forms is the easiest way to consolidate the concrete. Tap the walls until the concrete stops settling down into the forms. Over tapping can increase hydraulic pressure, so use caution.

Note: Be sure to properly consolidate concrete under the preinstalled aluminum coping at the radius corners.

Once the forms are filled, wipe off excess and smooth the top of the wall. A fine finish is not necessary since the top of the wall will be covered with the pool deck. Clean away any excess concrete that may have accumulated on the ground or against the base of the forms.

Pour approximately 8" to 12" of concrete under the steps to provide the proper support. Refer to step instructions when doing this.

Before the concrete has time to set up. Go around a double check to make sure your forms are still plumb and level. Make any necessary adjustments.

Step 18

Removing Forms and Cleaning walls

Allow the concrete to cure for at least a day before removing forms. If the weather is warmer you may remove the forms the next morning. Start by backing out all screws and removing all bracing. The plywood should peel away from the wall without any difficulty. You may have to use an angle grinder to cut away the plywood slot of the starter tie in order to remove the plywood from around the back side of the skimmer and some plumbing pipes if they are in the radius corners. The plywood slot of the starter ties on the inside of the pool can simply be snapped off by striking down on them with a hammer. This is recommended on the inside of the pool in preparation for the vermiculite floor installation.

Remove and clean up all forming materials around the immediate work area.

Using a 6” broad knife or flat edged scraper, knock off any bumps from the Spider Tie stacks where the screws penetrated the screw flange. Scrape smooth any concrete “build up” that may have occurred between the forms and around plumbing fittings. The sooner you do this after the pour the easier it will be to remove. If you encounter any “voids” or “honey combing”, mix and fill with a combination of Portland cement, sand and water. Trowel smooth and let dry.

Step 19

Main Drain

Note: When installing your pool drain system refer to the requirements found in the “Virginia Graeme Baker Pool and Spa Act”.

Starting at the footing where the main drain line comes into the pool. Excavate a shallow trench down to the center of the hopper. Connect main drain assemblies to the main drain line. Be sure the connection is glued properly so it won’t leak. Position the main drain assemblies so that they extend above the finish grade approximately 2”- 3” for the vermiculite pool bottom. Back fill the shallow trench

so the drain line is completely covered. Compact the dirt over the drain line and around the main drain assemblies.

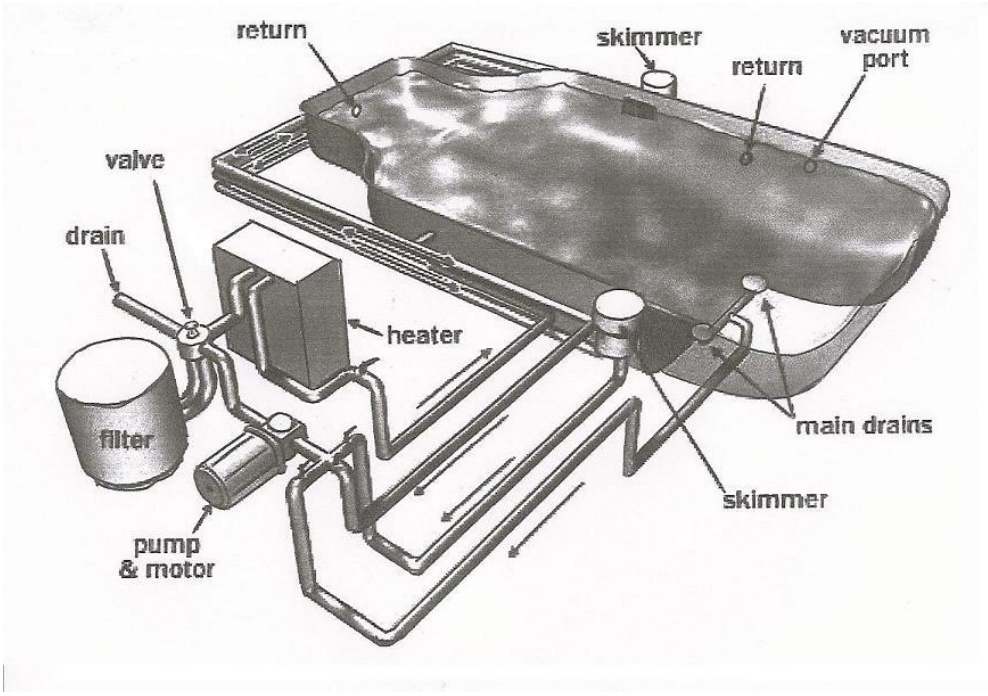
Step 20

Pump, Filter and heater installation

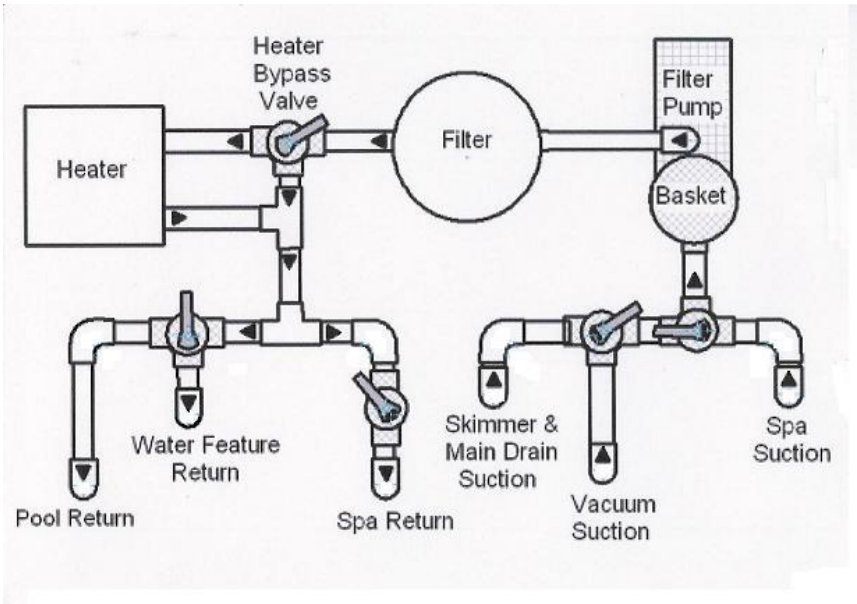
The way the water leaves your pool to be cleaned and filtered is through the main drain and the skimmer. The water is sucked through the pump then pushed through the filter then through the heater and returns back to the pool through the return lines.

Locate your pump, filter and heater within 20’ of your pool.

Connect a line to your skimmer and run both the skimmer line and main drain line to the suction side of the pool pump. Follow the suggested plumbing details found in details 20A and 20B for hooking up your equipment.



Detail 20A



Detail 20B

Step 21

Electrical

Follow your local code requirements for all electrical related to your pool. Be sure that you have addressed the Bonding requirements as well. If you have any questions speak your local building inspector and or a licensed electrician.

Step 22

Backfilling around the outside of the pool

Backfilling may be done before or after the installation of the vinyl liner. The following instructions for vinyl liner installation show liner being installed before backfilling.

Note: Make sure that all plumbing and electrical is in place and properly installed before beginning the backfilling process. Remove all debris that may be in the excavated area.

The easiest and most reliable material to use to backfill around the pool is “fill sand”. Sand compacts easily using water and it is easy to handle. It will not damage your plumbing pipes and electrical conduits.

As you backfill continue to saturate the sand using a garden hose. The water will help compact the sand as you go. This is important because fill material that has not been properly compacted will settle over time and cause complications with the pool deck and the underground pipes. Complete backfill to within two inches of the top of the concrete wall. This will allow enough depth for your concrete pool deck.

Step 22

Installing Coping

Place the end of a straight section of aluminum coping against the end of the preinstalled radius coping pieces. Drive a 1 ½” self drilling tech screw through the screw flange of the copping and into the top surface of each embedded fastening blocks. If the aluminum coping ends more than 6” away from a fastening block, it will be necessary to fasten the end of the coping strip to the top of the concrete wall. Do so using a 1 ½” “Blue Tapcon” screw. Continue until all the coping is installed. When you are finished the coping should be tight and secure all the way around the pool.

Note: Be sure that the coping “finishing clips” are installed where all the coping sections meet before pouring your concrete deck. You are now ready to install your vinyl liner.

Step 23

Finishing and Installing the Pool Bottom

Mixing Procedure for Vermiculite Pool Base

You can use a (6) cubic foot cement mixer or a five (5) cubic foot to nine

(9) cubic foot paddle type (mortar) mixer.

All the water goes into mixer first. (Check with supplier for recommended amounts.) Use the 55 gallon drum as a reservoir and a 5 gallon pail marked with lines equal distance apart so that you use the same amount of water each mix. A good place to start is 2 full pails of water. Add one mark depth of water until you get a good dry mix that when you squeeze a handful it holds into a ball and holds together and you will be able to trowel flat.

Next add recommended amount of Portland Type 1 cement. (Most vermiculite comes in 4 cu. foot bags and you use 1/2 bag of concrete per bag of vermiculite.) Stack your cement with a short length of #3 rebar under each bag in the center and with a utility knife cut the top of the bag in the center across the width. When you lift the re-bar and saw quickly with the re-bar you have 2 ½ bags sitting upright.

Add one (1) complete bag of vermiculite pool base. If you use a large mixer and mix 2 bags at a time consistency may be difficult to maintain.

Do not over mix. Run mixer 40 to 60 seconds to avoid clumping of mixture Note: If you are using a barrel mixer you will get the best mix if you lower the mixer barrel as low as possible without the material spilling out so the material falls from the top of the mixer as it is turning. If you do this as soon as possible after putting the vermiculite in the mixer you can get a good mix in less than 60 seconds.

Dump into a wheel barrow for transport to the pool. These are general mixing instructions. Consult your material supplier for individual manufacturer mixing procedures and quantities.

Troweling and Mixing Tips

1. Be sure your mixer is clean and free of debris.
2. Make sure to use the correct and same mixture every time so all batches are consistent.

3. Check your mix for visual characteristics. i.e. Finished mix has the same dark gray color every batch and no unmixed material visible, clumps or clods etc.
4. Do not over mix, as soon as the mix is consistent and unmixed material is not visible, it should come out of the mixer.
5. For sloped sections, use a stiffer mix (do this by using less water and the shortest mixing time.) The greater the degree of pitch, the stiffer your mix should be.
6. Do not install a vermiculite bottom on a day when a chance of rain is forecast, or if rain is expected before the liner can be installed.
7. If substrate is excessively dry or contains a large percentage of sand, wet it down thoroughly before applying the mix.
8. If mix conveyed into the pool bottom turns out to be too wet for application to sloped surfaces, trowel up to the point where the mix begins to slide back. Move sideways and apply to the next area. Continue in this manner around the hopper. When you return to the original area, the vermiculite will have set sufficiently to enable application of a second "course" on top of the first.
9. On extremely hot days when you have to use more water to get a consistent mix, always start with the normal amount of water and add water in small amounts (quarts not gallons) letting mix turn a couple turns. Once you determine the extra amount needed then increase the amount of water all at once on the next batch.
10. In areas where winter temperatures drop rapidly and often to sub-zero readings, some installers place the mix on a chicken wire mesh for added protection against future cracking. Be sure the wire doesn't have sharp edges protruding through because these will puncture the liner.
11. Vermiculite pool base is not recommended for use in sidewalks around pools.

Bottom Finishing Procedure

Bottom finishing can be done by progressing either from shallow to deep end or deep to shallow end. If you choose to finish from shallow to deep end, the work crew must be able to exit and enter the pool without disturbing the finished areas. For this purpose, a wooden or aluminum extension ladder with a 16" x 36" board attached to the bottom should be set on deep end floor **(if a ladder is not available use 2 kneeling boards and jump frog your way out being careful to lift the kneeling boards straight up and carefully place down.)** This will enable the work crew to climb out of the pool without disturbing the finished bottom. Mix can be transported from mixer to pool using a wheelbarrow, then use a 2 x 12 for

a ramp **(a 2 x 2 nailed on the end of the 2 x 12 for the end of the wheelbarrow to catch against will help keep the wheelbarrow and operator from falling into the pool)** to pour mixture over the pool wall directly into the pool bottom. The crew can then use a flat shovel for final placement.

Troweling the Bottom

When troweling the vermiculite pool base, a minimum thickness of 1-1/2 inches must be maintained throughout. Spread the vermiculite out with a flat shovel into roughly 2' x 6' sections. Use a 30" magnesium darby to spread and flatten the vermiculite. The darby does most of the work in finishing. Get the vermiculite as flat as possible by working the darby in several different directions. Use the 16" pool trowel to close the surface and finish. **(do not over trowel the pool floor trying to get it slick, you only need to remove trowel marks and close the surface.)** This section is now finished, and another can be started.

At the base of the hopper walls, create a two inch (2") fillet or radius. This is done by placing vermiculite at the wall base and shaping the fillet to its proper radius with a glass jar or other circular object. This fillet will give a smoother finish to the liner at the base of the wall than would a sharp base angle. Done at this point it also will take stress off the liner. A skilled troweler can usually form the two inch (2") fillet with only a trowel and mag. It is important to avoid sharp edges or pockets in the pool bottom, thus avoiding areas for dirt to collect after pool is filled. Trowling-Verm.jpg

As deep end slopes are completed and hopper bottom is troweled, strings and pins should be removed from the bottom and voids in the vermiculite troweled smooth. Be careful to trowel out any "nerds" or crumbs **(dried vermiculite balls from back edge of trowel)** as work progresses. These will show through the liner and the customer will think they are stones especially at night with the light on if they are not taken out. If the bottom is troweled from deep to shallow it will be extremely difficult to keep crumbs out of finished bottom. Debris cannot be swept out until bottom is cured. Most vermiculite mixes are not ready to walk on for at least 48 hours, delaying liner installation.

When troweling shallow to deep, keep working crumbs and debris to a final corner of the hopper. Trowel deep end walls first then the floor around drain and work your way onto the ladder board. Before exiting the pool pull the tape off the

main drain keeping the screw holes clean. Insert two (2) face plate screws 1/2 way down into the drain, opposite of each other. Leave the pool carefully to avoid crumbs and gently lift out the ladder and ladder board with two (2) crew members one on each side of the ladder.

Step 24

Installing the Vinyl Liner

The first step for installation of the liner is to wipe down the pool walls with a rag to remove any dirt or vermiculite that may be stuck to the walls. Next, tape the pool wall joints between the steps and the Spider Tie “Wet"concrete wall with duct tape to create and air seal and prevent air from leaking through wall joints while the liner is vacuumed into place. Tape should extend from the bottom edge of coping down to the top edge of the vermiculite bottom material. It is also recommended to tape the back side edge of the coping on the top of the pool panel to improve air seal for fitting liner.

<u>Method # 1</u>

After the vermiculite bottom has been completed, the liner should be rolled out on to the ground, preferably on grass, to remove the packaging wrinkles. If it is a extreme hot or sunny day do not leave the liner out too long, it will become soft

in the heat and stretch too easily. When the liner is ready to install, roll it up on a four inch (4") diameter aluminum irrigation pipe at least three feet (3') longer than the width of the pool. Roll the liner onto the pipe starting at the deep end of the liner so the shallow end is on top and you can install the liner starting from the shallow end of the pool. Be careful when rolling out the liner not to pick up any leaves, stones, twigs or dirt on the liner bottom. Stand 2 x 4's on edge just behind the coping to avoid liner pole bending the coping. Be sure to tape the pole where it contacts the coping if the 2 x 4's are not used. **Note: Using a pipe without 2x4's supporting the weight of the line is not recommended.**

Set the rolled up liner and pipe on top of the pool wall at the shallow end so it will unroll from shallow to deep. Begin installation of the liner aligning center of liner with center of pool. Unroll the liner and place the liner bead in liner track under the coping, across the end and down the sides to the break. Check at this point for proper liner alignment. This can be done by comparing the position of the corner seams to the corners of the pool wall. Readjust liner in shallow end if necessary to center and make each corner match. Proceed down each side toward the deep end. Be very careful not to stretch liner perimeter while installing. If more perimeter is needed at final stages of installation, stretch the liner along the sides of the pool. Unroll liner off pole as needed while installing. Check the deep end corners for alignment. If all the corners are properly aligned you are ready to vacuum the liner into place.

Method # 2

Using this method will require extra installation time. After vermiculite installation and if it is firm enough to walk on, (usually by the next day), place liner in shallow end, rolled up as it comes from the carton. Be sure to sweep out any debris that may be in the pool bottom.

Position liner at the shallow end wall and unroll down center of pool into deep end. Begin installation of the shallow end of the pool aligning as is in Method # 1.

Always use kneeling boards whenever walking on a freshly finished pool floor. Footprints are expensive to fix after the pool is filled. Footprints that are not noticeable now not jump out at you under the pool light.

Note: In these photos the dealer is using wall foam which is not included in the pool kit package. It comes in a 125' roll and if you wish to use foam you can tape it along the top edge. On windy days use foam spray tack, it usually will take 2 cans, Spray along the top and the bottom of the panel and spray a X diagonally across the panel. Be sure to cut the foam around the skimmer, returns and the light. If you install a face plate over the foam it will result in leaking through the foam behind the liner.

Vacuuming Liner into Place

Be sure liner is correctly aligned in the pool before proceeding. After complete liner installation, prepare to vacuum the liner into place with two (2) commercial type vacuums or heavy-duty shop vacs. Tape a vacuum hose between liner and wall panel at the break and another hose on the opposite side at the break. If preferred, one hose may be run through the skimmer opening. Be sure to seal all air leaks with duct tape. Places that need to be sealed to prevent air leaks are: If a step section is to be used, install the step face plate when you are sure all corners are properly aligned and the liner is wrinkle free. Place the diving board or a 2 x 12 plank that has the edges duct taped or filed rounded with a wood rasp and position on the floor tight against the step and place 3 sand bags on the board. Failure to take this precaution can result in excessive stretch of the liner when the pool is filled and the force will pull the liner out from under the bottom face plate and leaking will result.

If Vacuum does not remove air from behind the liner check!

1. Joints between steps and wall, (should have been duct taped before liner was dropped); **2.** Return fitting inlets or the end of the pipe must be duct

taped; **3.** Skimmer plumbing line taped air tight; **4.** Around vacuum holes on top of skimmer lid. Duct tape around the extension collar of the skimmer and tape across the lid and trim duct tape at the outer edge of the skimmer lid. Leave the lid taped until you've poured the deck.; **5.** Light conduit end must be taped or deck box if installed; **6.** Tape ends of any plumbing that might already be installed. If plumbing has been run to the filter tape the backwash port.

At this point two (2) or three (3) of the crew should position themselves behind the shallow end wall in the 24" over dig area, while another crew member prepares to turn on the vacuums. The crew behind the shallow end wall can reach into the pool and grasp the liner near the seam at the bottom of the wall. They should then pull the liner upward toward the top of the wall and hold it in place. Turn the vacuums on and the hold liner in pulled position. This will draw the liner up into the shallow end until the deep end is fitted by the suction of the vacuums. This procedure will minimize excessive stretching of the liner into the deep end. As the vacuum pressure increases behind the liner, it will become increasingly difficult to hold the liner in the pulled position. When there is sufficient vacuum to hold the liner from sliding back into the deep end, release the liner slowly. Hold the liner into the shallow end corners using sand bags if necessary.

Note: Your filter sand bags gently placed against the wall in opposite corners will remove most of the wrinkles in the center of the pool. Don't worry about the main drain screws they will not tear the liner so long as all adjustments are done slowly.

Examine the liner from all directions. See if the liner is seated correctly in the bottom of the pool or if it needs repositioning. Make adjustments where necessary (if possible while the vacuums remain running) by pulling the liner into place. Before filling the pool, all folds or wrinkles must be pulled out flat. It may be necessary to turn off vacuums and reposition the liner as needed. **Any wrinkles after this stage will remain permanently.**

After properly positioning the liner, start filling the pool with water **while the vacuums are still running.** If using garden hoses to fill the pool, fill the hopper with a few inches of water and place the end of the hoses on the bottom of the hopper. (Examine hose ends to be sure no sharp edges will damage the liner.) After six (6) to eight (8) inches of water has filled the deep end, turn off water source and install main drain gasket and face plate while underwater.

Installation of Main Drain Face Plate

If bottom material is still soft at this stage a ladder and board as described in "Bottom Finishing Procedure", should be used to avoid footprints in the bottom. **Be extremely careful of sharp edges on the board that might puncture the liner! Proceed as follows:**

1. Very carefully prick with utility knife the liner (about 1/8” slit) in the center of the heads of the screws previously installed and using your thumbs push down and stretch the liner over the head of all the screws. Back screws out through vinyl liner and quickly position gasket and face plate over the main drain and replace the screws into the main drain body.

2. Tighten screws evenly and securely in a cross pattern sequence.
CAUTION: Don't over tighten, screws will break.

3. After completely installing face plate, trim vinyl from inside main drain face plate with a sharp utility knife.

4. With the remaining two screws install the anti vortex main drain lid. **Note: This is very important as a safety measure because when the pool pump is on main drain the vortex action without this lid can be very dangerous. Never use pool should this lid be broken or missing.**

Continue to fill pool with water. It may be necessary to remove some wrinkles during the filling operation. Wrinkles must be removed before they are covered with more than two inches of water. If wrinkles remain, pump the water out. Remove the wrinkles and refill the pool. Avoid this costly and time consuming error by removing wrinkles before they are covered with water or use a water closet plunger. (see directions below)

When about six inches (6") maximum of water is in the shallow end, turn off vacuums and remove hoses from behind the liner. Once vacuums are removed, continue filling the pool up to the light. If you do not have a light fill up to 2" below the lowest return fitting. If you install the face plates before the water is up to them the liner will stretch and leave a pucker wrinkle above the face plate, or worse yet pull out from under the face plate and leak water between the liner and the wall.

Note: Vacuums must remain running until the water is into the shallow end or wrinkles will develop. Should a small wrinkle be observed underwater you can use a toilet plunger and place it about 2 or 3" from the wrinkle and with jerking motions up and down and gently sideways towards the closest side wall work the wrinkle out. Repeat this procedure as many times as needed the wrinkle will get smaller each time and by the time you get to the wall the wrinkle is usually gone.

Filling the Pool with a Fire Hydrant or Tanker Truck

If the pool is to be filled from a high pressure source of water, such as a fire hydrant or tanker truck, fill the hopper with two feet (2') of water from a garden hose before the high pressure source is turn on. Direct the water from this source into the partially filled hopper. This procedure should be followed because water from a high pressure source, if allowed to hit the hopper sides or bottom directly, can make an impression in the freshly poured vermiculite under the liner and disturb an otherwise smooth pool bottom. Always flush the water source for a few

minutes away from the pool area before filling the pool. This removes any accumulated sediment that may be in the water hydrant lines.

Note: When you start filling with only 2' of water in the pool hopper use a 2 x10 plank with the hose secured to the plank by putting a 20 penny nail on both sides of the hose and duct tape or strap around the plank and hose securely. Support under the plank where it crosses the coping to avoid bending or damaging the coping. A short piece of 2x4 on edge behind the coping or sand bags will work well. Place a counter weight at the end of the plank so it does not fall forward into the pool.

Installation Nicheless Light Mounting Bracket

1. Prick the liner in the center of the mounting bolt head and remove the mounting bolts.

2. Place the round plastic mounting spacer with the protrusions facing out (towards the pool) and the mounting bracket over the holes and tighten securely to the ceramic fixture.

3. You must attach grounding wire to the grounding lug on the upper left hand corner of the mounting bracket and run to the deck box.

4. Wrap a length of cord up to a maximum of 6 feet (6') long on the back of the light assembly. Wind a maximum of 2-3/4 wraps of cord so that the last wrap stops at the top of the light. This extra cord allows you to bring the light out of the pool to install a new lamp and for servicing on the deck. Leave 2" or 3" of slack cord at the top so the light can be tipped out for removal.
5. Feed the remaining cord along with a #8 ground wire through the mounting hub to the deck box or switch and cut cord leaving a foot of cord extra for the electrician to work with. Place light clip over pin on the bottom of the light mounting bracket and press lightly to secure. Secure the light at top with the captive screw.

Installation of Light Niche Plate

As the water reaches to approximately two inches (2") of the bottom of the light opening proceed as follows to install light niche plate.

1. Remove the previously installed face plate screws by piercing the liner at the screw head and reversing the screws out of holes.
2. Align face plate being sure it is right side up. Refer to manufacturer's instructions. Insert screws through face plate into liner holes, and partially tighten.
3. Insert remaining screws, piercing the liner and tightening each in a cross pattern sequence. Check all screws for tightness one final time.
4. Cut liner along inside edges of face plate.
5. Make sure copper or PVC conduit is installed to a point at least 12" above the pool coping before continuing to fill the pool or an overflow will result.

Consult the current **National Electrical Code Handbook** for specific requirements on installation and placement of the junction box.

Step Section Face Plates

For installation of step section face plates please refer to individual manufacturers instructions. It is recommended that step sections be sealed with tape behind the liner during vacuuming and filling. When the water level has reached six inches (6") below the bottom of the face plate, the face plate must be installed before continuing to fill the pool. The diving board is being used to hold the liner up tight against the step while the pool is filling. As the deep end water level get higher if the board starts to come away from the step add 2 or 3 bags of your filter sand on the board.

Installation of Inlet Fitting Face Plates

When water is approximately two inches (2") below inlets, proceed as follow to install the inlet fitting face plates.

1. Prick the head of the screws and remove previously installed face plate screws.

2. Position face plate and re-install the screws.

3. Tighten all screws in a cross pattern sequence.

4. Cut liner inside face plate.

Installation of skimmer Face Plate

Allow water to reach within one to two inches (1-2") of bottom of skimmer opening. Proceed as follows to install the skimmer face plate.

1. Remove previously installed face plate screws.

2. Position face plate and gasket then re-install the screws at each corner.

3. Insert remaining screws and tighten in a cross pattern sequence.

4. Cut liner inside face plate.

Disclaimer

These instructions were compiled simply to assist the installer in offering general information to install a pool using the Spider Tie “Wet” concrete pool wall forming system. **Spider Tie accepts no responsibility** regarding the installation process.

There are too many variables that exist on a project that make it difficult to address all of them in a set of written instructions. It is always recommended to consult a “professional licensed pool contractor” before undertaking a project of this nature. Always refer to your local Building Agency and obtain the proper permits and follow their specified building practices.

Consult your local utility companies prior to starting. Always follow “safe” working practices.

Spider Tie only warranties the” Spider Tie” product. Spider Tie will not be held responsible for the performance or quality of any other materials or products used in the entire building

process. You will need to contact the manufactures of those other materials and products should a problem arise.

Spider Ties should be stored out of the weather in a cool dry location. Do not use Spider Ties if they have been left outside and unprotected. Prolonged exposure to direct sun or freezing temperatures can affect the performance of Spider Ties. Should there be a prolonged delay finishing the pool once the Spider Ties have been installed and the concrete wall has been poured, it will become necessary to protect the exposed screw flange from direct sun light and harsh weather.

Spider Tie “Dry” and Spider Tie “Wet” have been formulated for different applications and purposes. Always refer to the manufactures recommendations regarding use and application practices. Spider Tie will not warrantee product if used outside its specified application.

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