



Inground Pool Guide

CUSTOMER SUPPORT CAN BE REACHED AT ANY OF THE FOLLOWING:

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INTRODUCTION

Thank you for your pool purchase! Proper installation of your swimming pool is the most critical factor in homeowner satisfaction and continued enjoyment. The design of this guide provides the installer with the best-known recommendations for a successful pool installation based on years of experience, research, and on the job know-how. It contains the most current information to make your installation experience easier and more efficient.

Before beginning construction, the installer must acquire construction permits and then perform their work in accordance with the building regulations of the area in which the swimming pool is to be constructed.

START: Refer to the Delivery Process and Inventory Check document that was previously sent to you prior to starting the build of your pool. If you did not receive the above-mentioned document please reach out to Royal Swimming Pools Inc. immediately.

READ THIS INSTALLATION GUIDE THOROUGHLY AND COMPLETELY BEFORE BEGINNING CONSTRUCTION

We have also compiled a video that overviews the entire process of installing an inground pool.

From excavation, to jumping in your pool, we have you covered!

<http://www.royalswimmingpools.com/Pool-Construction-Video.htm>

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IF THERE ARE ANY DISCREPANCIES BETWEEN THIS INFORMATION AND STATE OR LOCAL BUILDING CODES, OR IF STATE OR LOCAL CODES ARE MORE COMPREHENSIVE OR SPECIFIC ABOUT CONSTRUCTION, DESIGN, OR SAFETY, THE STATE AND FOCAL REGULATIONS MUST TAKE PRECEDENCE.

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PRELIMINARY CONSIDERATIONS

BUILDING CODES/PERMITS

Advance knowledge concerning State and Local Swimming Pool Codes will prevent fines and work stoppage orders. Most ordinances vary considerably from one county to another and nothing should be assumed or implied. It may be necessary for the homeowner/pool builder to present dig specs and engineering specs to the local building department. You should also obtain a copy of the local swimming pool code for your area. Be sure that you understand all code requirements that are both directly and indirectly associated with your swimming pool. Take special note of sewer, drainage, fencing, lot line, power lines, fire, and electrical requirements.

UTILITIES REQUIRED

- Water- for construction and filling of pool
- Electrical- temporary supply during construction and a permanent supply for the pump and pool lighting
- Sewage- for adequate drainage
- Fuel for heater- Natural Gas or Propane

IMPORTANT! Obtain the required permits before starting your swimming pool installation

SELECTING THE POOL SITE

Obstructions must be considered before selecting the final pool site. Obstructions could include underground wires, gas lines, septic tanks, dry-well systems, plumbing, trees, and overhead power lines. Underground obstruction and utilities should be located before excavation begins. Utility companies will usually locate underground pipes and cables that are located on your property at no charge to you. If various obstructions are unavoidable, a compromise must be reached. However, keep in mind the labor and material costs of moving or replacing obstructions. We've found that most pool owners choose the path of least resistance for the sake of practicality and budget.

Sun and Shade can be an important factor when determining the pool site as well. Excessive shaded areas from trees and other buildings could result in uncomfortable swimming conditions during cooler weather months which could increase your heating costs considerably. Likewise, excessive sun can be unbearable for some during the summer months. You must determine your pools placement based on your personal preferences and ideal usage.

Proper pool orientation will take advantage of sunny days for comfortable swimming condition, decrease heating costs, and in some states, meet requirements set forth by the public health department referring to diving board placement.

Existing Landscape Removal is dependent on individual preference. A certain amount of removal might be possible without disturbing the natural atmosphere of the backyard. This can be done by careful use of planters, shrubs, and flowers. Of course, you will want to remove any trees/shrubs located directly inside the pool layout of your final chosen pool site. When it becomes necessary to remove trees, the entire root system needs to be excavated in order to avoid new trees sprouting through your pool and/or surrounding areas in the future. An effective method of preventing continued root growth is to apply copper sulfate to the root system.

Ease of Excavation to provide the best access and most ideal working conditions. Placing the pool a few feet one way or the other, may permit improved excavation conditions, easier dirt removal and concrete placement.

Convenient Access to changing facilities and house exits also requires some thought. Available site lines for supervision of the swimming area from inside the house via windows and/or glass doors should also be considered. As you select your pool site, make a rough layout of where you think the pool should be located. Then consider decking and walk ways by staking out their approximate positions.

The Location of the Pool in Relation to Other Buildings should be both an aesthetic and practical consideration. Some considerations are whether the pool should be laid out parallel, perpendicular, or at a 45-degree angle to an existing house, building, building line, hedgerow, fence and/or another dominant object.

Advanced Knowledge of Subsoil Conditions can be helpful in determining the placement of the pool. It is advisable under certain circumstances (areas that have excavation issues) to probe the subgrade by boring a series of test holes. The results would suggest the best position and grade of the pool. Problems such as a rocky substrate, high water table, or excessive clay, should be located before construction. They can be eliminated simply by moving the pool, thus keeping the construction process as smooth and economical as possible.

Check the Selected Location for Grade or Elevation of the Pool as the pool walls must rest on undisturbed soil. Keep the top surface of the pool (pool deck) at least three to four inches above the highest ground elevation in the area. This will avoid any surface drainage back into the pool.

TIP

Other terms used to describe the top of the pool coping are pool grade, final elevation or "top surface."

The Equipment Location should be included in your considerations:

- You'll want to place your filter on a concrete slab. Be sure to make the slab large enough for all equipment, usually 3' X 4' or 3' X 7' with a heater. Also, consider at this time whether an enclosure will be built over the equipment in order to plan the slab size accordingly.
- Keep the filter within 20' of the pool to maintain optimum pump performance.
- Never locate the filter and pump more than six inches above or six inches below pool grade. Otherwise, pump priming or overflow problems are likely to occur.
- Never locate the filter and pump in a basement as it is possible that a malfunction in plumbing could cause flooding.
- Consider where the backwash water will drain. Is there adequate drainage? Check for local codes requiring special methods to dispose backwash water.
- The filter location is also important from an aesthetic point of view. When making the rough layout of the pool, visualize placement of the filter and plan for future landscaping or enclosures. Out of sight of the immediate pool area is usually preferred.

EXCAVATION CONTRACTOR

One of the most important phases that makes for a smooth installation is the excavation. If the excavation is incorrect, each subsequent step becomes costlier as well as more difficult. For instance, if the bottom grade of the pool is too shallow and rough, you will have to resort to hours or even days of hand trimming. A skilled excavation contractor should be chosen for this critical part of the installation process. Search for a local "excavating contractor" in your area or online at www.realpages.com.

When selecting an excavation contractor be sure to confirm their experience through referrals, building contractors, or local officials. Also note that the job can be finished most efficiently if the contractor has a rubber-tire backhoe with a bucket capacity of at least one-half cubic yard and adequate mobility to enable loading excess dirt directly into the vessel which will be removing it from the property. For this, a dump truck will speed the job along as well.

The excavator, regardless of his experience level, should be sure to study the pool drawings in detail before starting the excavation.

TIP

Set the exact requirements of the job you are requesting. You will want to communicate with your contractor the exact route for access to the excavation site and where the excess dirt is to be disposed of. You may wish to incorporate performance requirements and pool construction plans into a contract to avoid any misunderstandings later.

BASIC MINIMUM TOOLS RECOMMENDED

Broom	Phillips & Large Slot Screwdriver
Carpenter's level, Shot stick, and Water Level or Transit Level	Shovels (2 minimum)
Commercial Shop Vac with hose or Liner Vacuum	Socket set, adjustable wrench, open-end wrench, & 18" Pipe Wrench Channellock Pliers
Drills and assorted bits	Spray Paint
Duct Tape	Tape Measure
Extension Cords	Trowels; steel and magnesium
Hacksaw, Hole Saw Set, & Jig Saw	Utility Knife
Mason's String/Line, and C-Clamps	Water source with garden hose and nozzle
Pick, Mattock and Sledge hammers; 3lb. and 10lb	Wheelbarrow

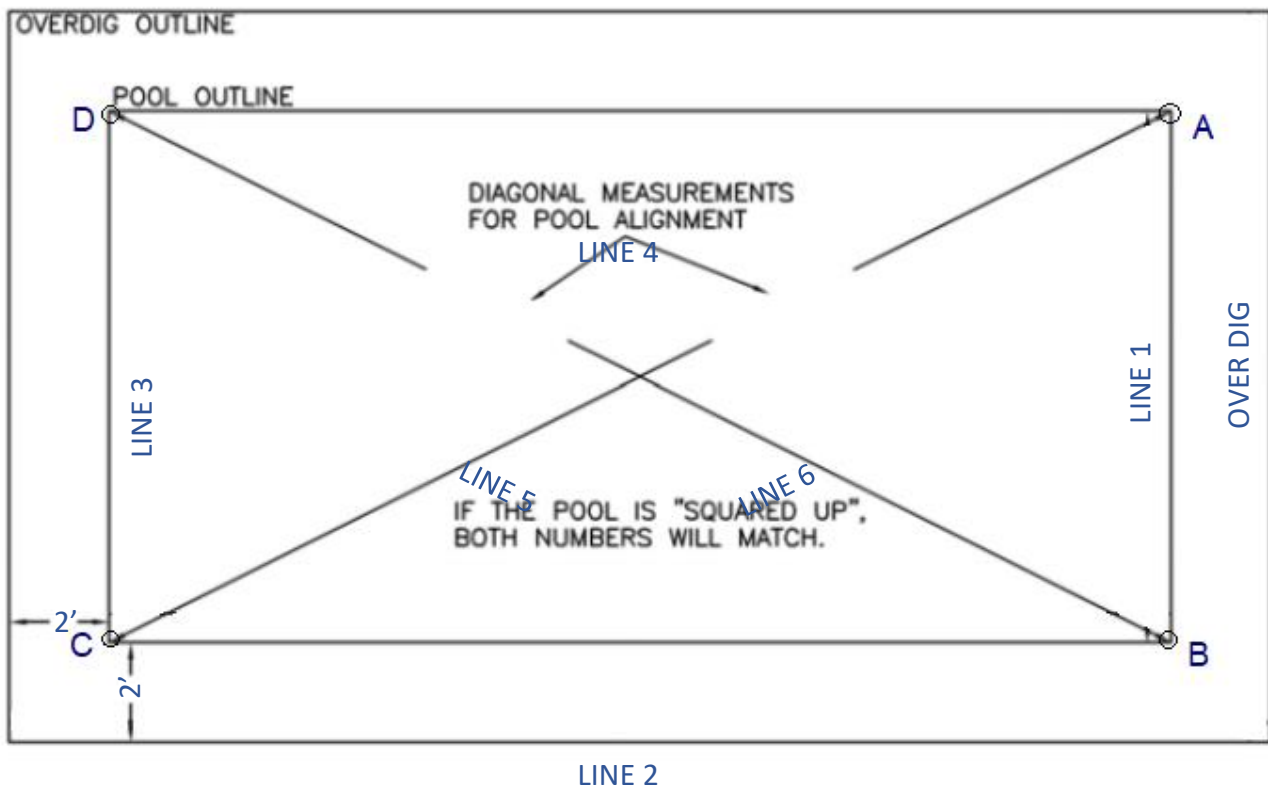
POOL LAYOUT

TOOLS

Level and/or shot stick, mason's string, spray paint, tape measurer, (8-10) 3/8" x 24" rebar stakes, hammer, and dig specification drawing

Once the pool's location has been chosen, its perimeter must be marked on the ground. The area beyond the perimeter is known as the 'over dig' (see Figure A) and is used for wall and brace placement. The over dig area should be 2 feet around the entire perimeter of your pool.

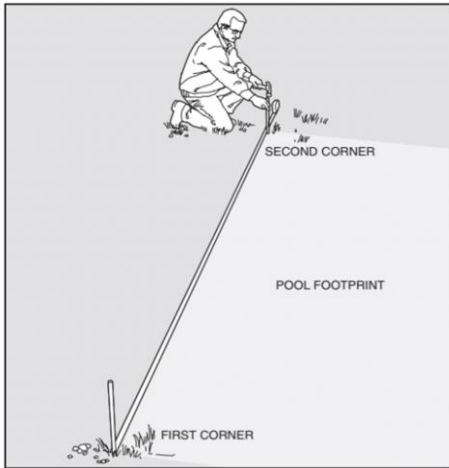
FIGURE A:



*LINES 5 AND 6 SHOULD BE EQUAL

POOL SIZE	OVERDIG LINES 1 & 3	LINES 2 & 4	LINE 5	LINE 6
14' X 28'	18'	32'		
16' X 32'	20'	36'		
16' X 36'	20'	40'		
18' X 36'	22'	40'		
20' X 40'	24'	44'		

LAYOUT : STEP 1

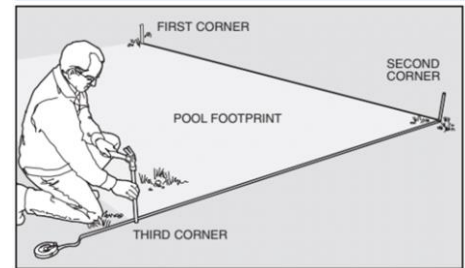


←**STEP 1**- From rebar stake A (first corner), lay out the distance of one side of the pool to rebar stake B. Care should be taken when setting the direction of the rebar stake as this makes up the above mentioned "Line 1" in Figure A. Use the measurement guides above to determine how long Line 1 needs to be.

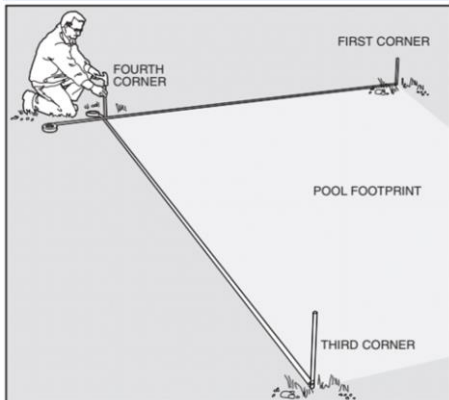
STEP 2- Starting at rebar stake B (Second Corner) measure out the appropriate length for "Line 2" and add rebar stake C at the third corner, squared to the previous corners. →

Additional information on "squaring" is outlined on page 12.

LAYOUT : STEP 2



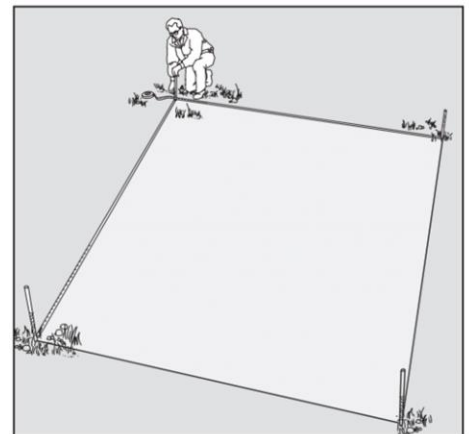
LAYOUT : STEP 3



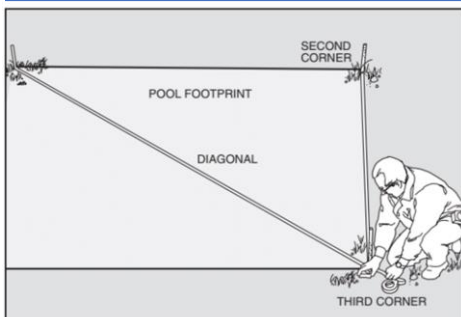
←**STEP 3**- Continuing to use the measurements in the table above for your specific pool type, measure the appropriate length for "Line 3" to locate the fourth corner with rebar stake D.

STEP 4- Measure back to the first corner stake A, completing the layout. Now measure the length of "Line 3" (D to C). The length should be equal to the length of "Line 1" (A to B). →

LAYOUT : STEP 4



LAYOUT : STEP 5



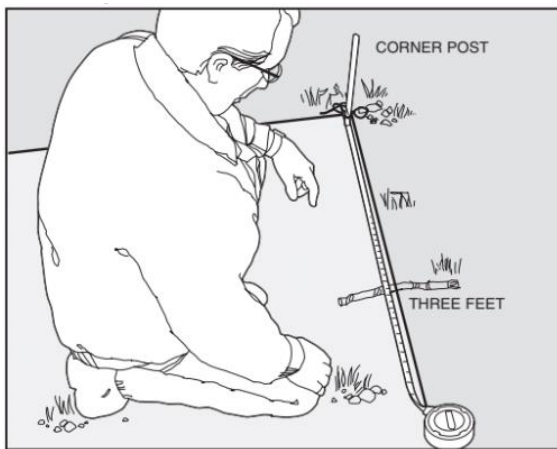
←**STEP 5**- Square the layout by finding equal diagonals of Lines 5 and 6. (Details on pg. 12)

HOW TO KEEP THE LAYOUT SQUARE

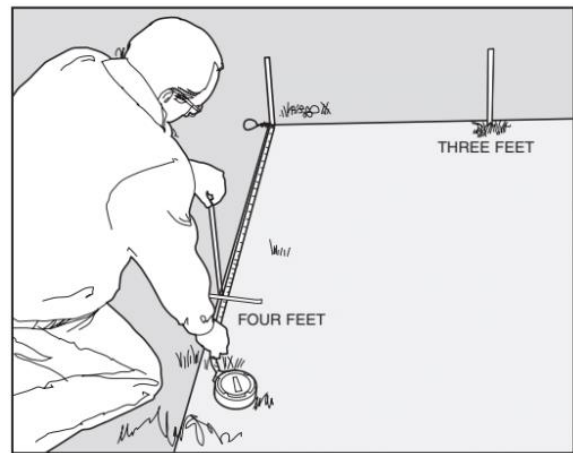
Care must be taken to keep the layout square. Measure the distance between opposing corners and move the stakes until they are at an equal distant. At the same time, the length and width dimensions of your pool lines/sides must remain equal to their intended measurements.

TIP

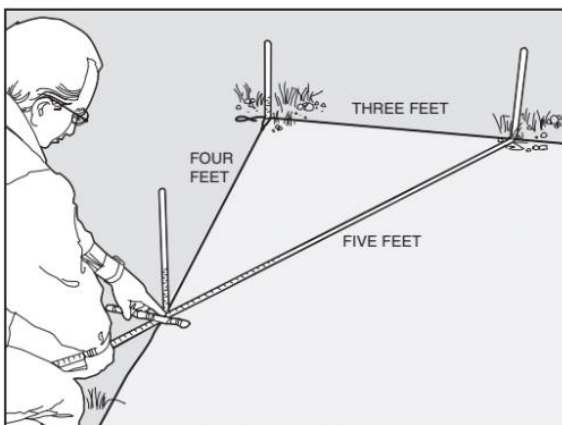
Equal diagonals do not *guarantee* that a pool is square unless the width, length and diagonal dimensions are equal to their opposing line measurement.



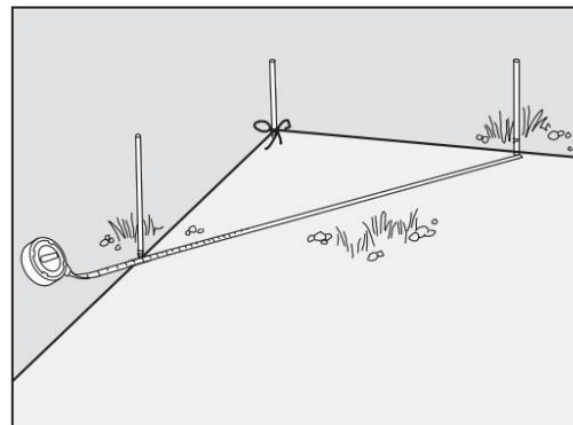
Starting at a corner, mark one side at 3 feet.



Mark the perpendicular side at 4 feet.



The diagonal distance between the two points will be five feet. The corner is square if it measures five feet.

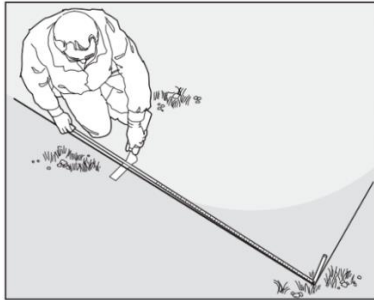


Adjust the sides as required to make square. Doubling or tripling the leg Measurements will result in increased accuracy

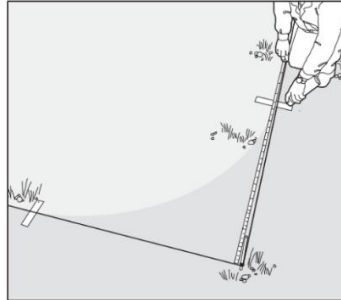
RECTANGLE POOLS WITH RADIUS CORNERS/ROUND POOLS

Rectangle pools with radius corners (or Round Pools) can be laid out by finding a point at the center of the arc and placing a stake there. Using a measuring tape attached to the stake, hold a can of spray paint at a point equal to the length of the radius on the tape. Paint the complete circle as allowed by the measured length.

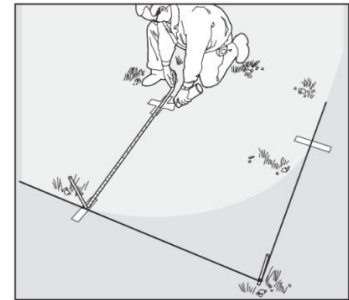
To find the corner radius axis of a rectilinear pool, use string lines or straight edges projecting from perpendicular sides of the pool to a stake placed at their intersection.



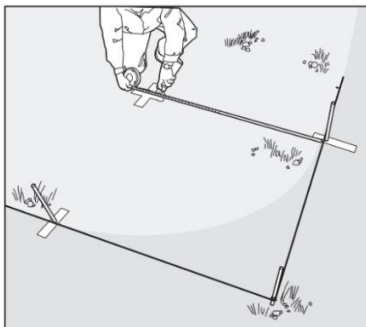
Measure back from the corner stake the same dimension as the radius of the corner.



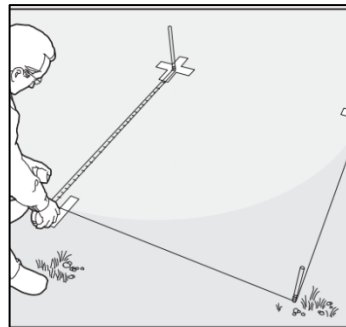
Repeat measurement and mark on second side.



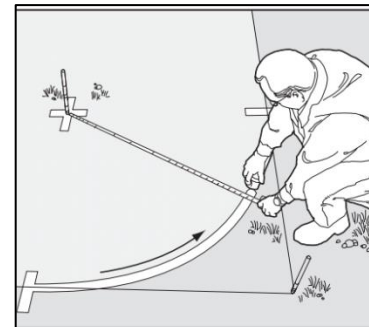
Place a stake at the mark on each side. Measure same distance and spray a small arc.



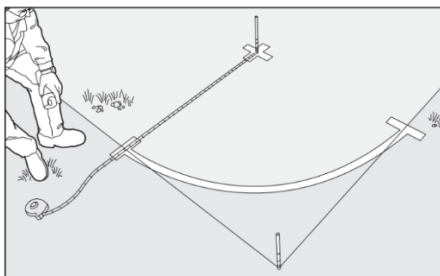
Measure the same distance and spray a small arc from the second leg.



Place a stake where arcs intersect. This will be the corner.



Tie a wire to the axis stake (or use a tape) and mark the corner with spray paint.



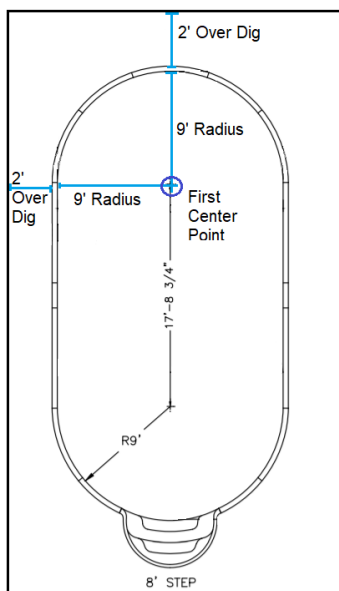
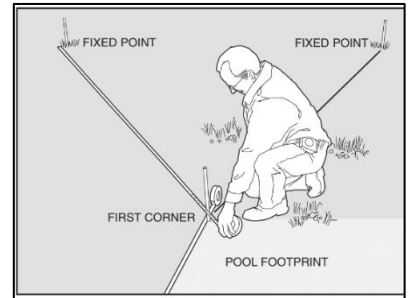
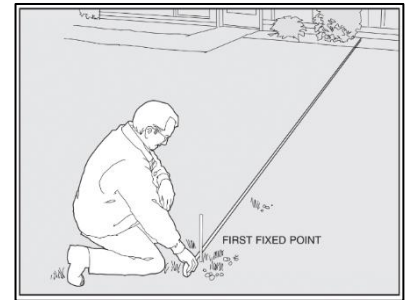
Finished round corner layout.

TIP

Skip ahead to EXCAVATION on page 17 if you are installing a rectangle pool with radius corners or round pool.

OVAL POOLS

As any oval or freeform shape fits within a rectangle, it may be easier to set the location of the pool if the rectangle is laid out first as described in the previous pages. Choose a fixed point, away from the over dig (typically the house), from which the first corner stake will be located. Measure and mark the distance from the fixed point to the location of the first corner stake. Square the first corner to your fixed point. The remaining corner stakes can now be set and squared accordingly as described on page 11.

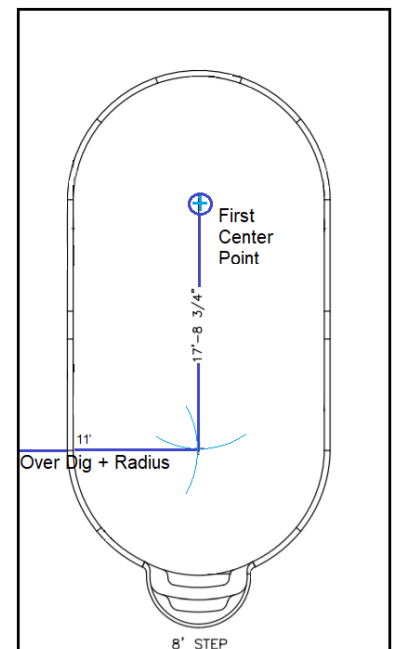


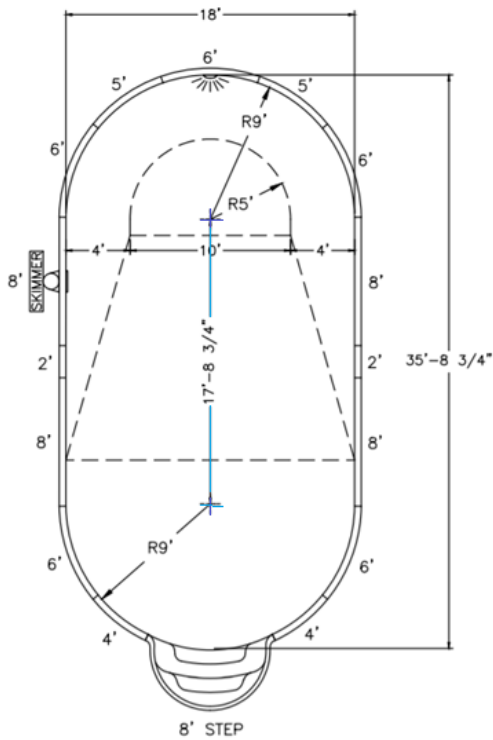
Once you have your rectangle with a 2' over dig mapped out, start by finding your center line stake points. Start at either short side of your pool (Line 1 or 3 from Figure A on pg. 10), from the center of that line, measure inside your box the distance of your over dig plus the distance of your radius (the over dig is traditionally 2' and the radius can be found on your dig spec) For this example our radius is 9'. So, measuring inward the 2' over dig plus our 9' radius, results in marking the ground at 11' in from your rectangle.

From that mark, go over perpendicularly to the side of your rectangle (Line 4 or 2 from Figure A) and measure inward another 11'. Drive a rebar stake in the ground where these two points intersect to indicate your first center point as shown.

You can either repeat this process on the opposite side of your pool, in which case once you have your two center points staked and the distance between them should equal the center line distance shown on your dig spec. In this example, that would be 17' 8 3/4".

Another way to find your second center point is the swing method. Tie string or attach your tape measurer to your first center point and measure out the center line distance found on your dig spec. In this example, that would be 17' 8 3/4". Keeping the string or measurer tight, use spray paint while you swing your 17' 8 3/4" radius arc. Do the same for your over dig plus radius (here 11'). Where these two points intersect should mark your second center point. Square both center points to your fixed point before moving forward.

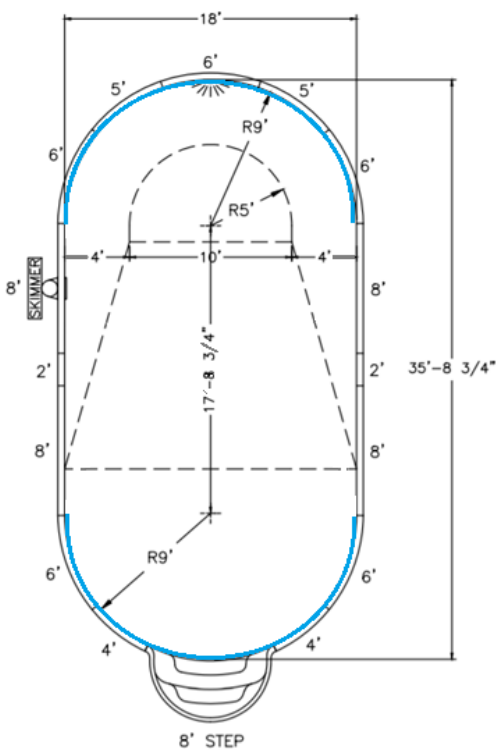
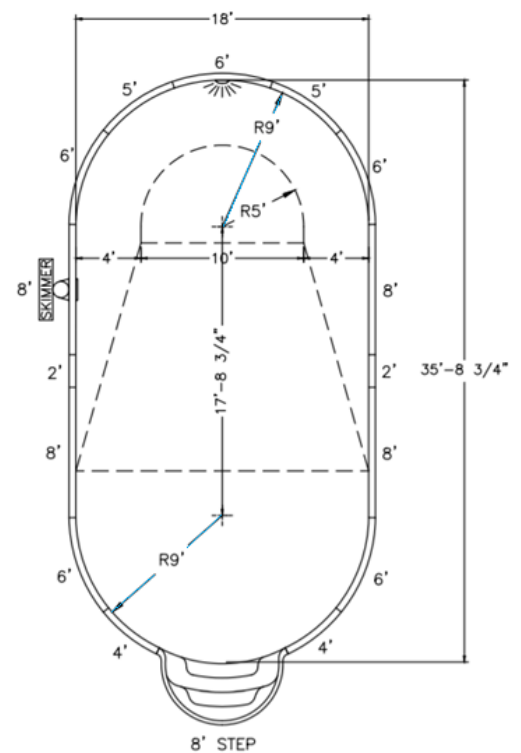




We will continue to reference the dig spec to the left, however make sure to use your provided dig spec to determine the measurements for your pool.

Having your center line accurate is essential as the remaining measurements work off of this line. You should double check that your center points measure square to your fixed point before moving forward.

Tie string or attach your tape measurer to one of the center points and measure out the desired radius (from your dig spec) for the rounded portion of your pool. In this example, the radius is 9'. →



Keeping the string or measurer tight, use spray paint to swing your 9' radius arc from one straight wall edge to the other. You can double check these marks by measuring from the center point stake in any direction and you should measure 9' from stake to spray paint mark every time.

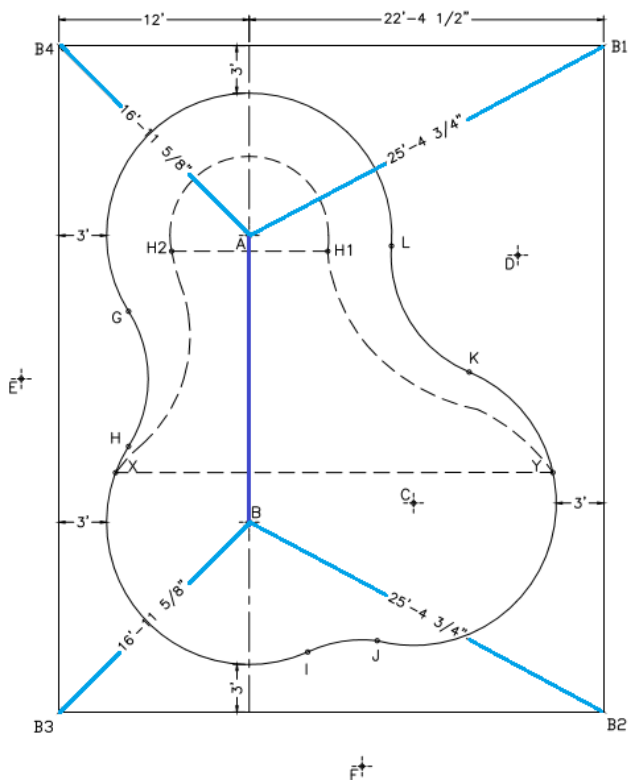
Once you have your radiuses properly marked you can measure the straight edge walls, making sure that the numbers match your dig spec, and mark/string them according.

You can also use string to showcase your future slope line locations.

FREEFORM POOLS

For freeform pools, the rectangular box (page 11) is laid out and measurements are taken from the corners of the box to locations on the pool. Your box corners will act as your fixed points once the box is complete and squared. Using your dig specs identify the center line(s) and tie string from one end to the other. Do the same at the corner stakes. Refer to the drawing and mark all other points including straight lines and arcs as indicated. Once that is complete the perimeter can be marked with paint.

For this example, we will be using the dig spec below however always refer to your own dig spec for specific measurements.



BOX DIMENSIONS	
B1-B2	42' - 1 ⁵ / ₈ "
B2-B3	34' - 4 ¹ / ₂ "
B1-B3	54' - 4 ⁵ / ₈ "

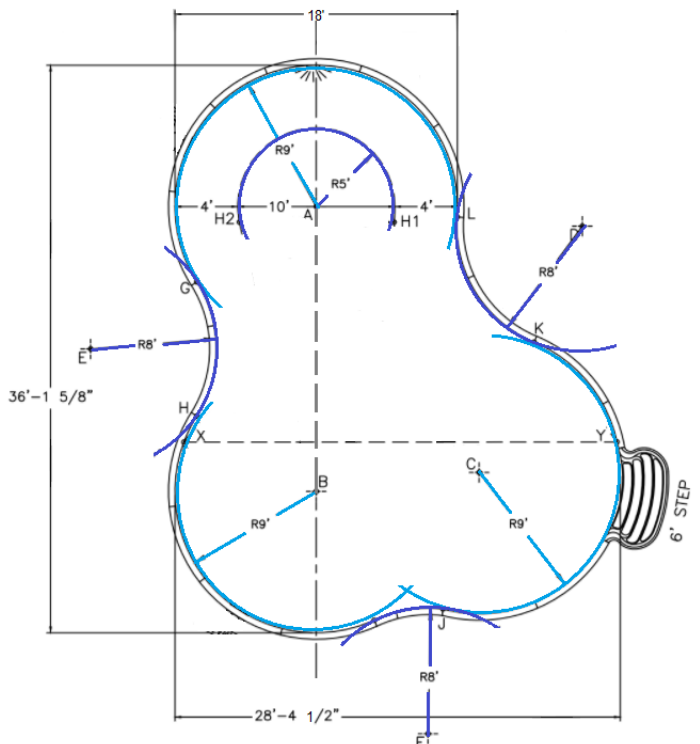
STAKE OUT	
A - B	18' - 1 ⁵ / ₈ "
A - C	19' - 10 ¹ / ₄ "
A - D	17' - 0"
A - E	17' - 0"
B - C	10' - 5 ³ / ₈ "
B - E	17' - 0"
B - F	17' - 0"
C - D	17' - 0"
C - F	16' - 11 ¹ / ₂ "

BREAK-OFF	
A - Y	17' - 2 ¹ / ₂ "
A - X	24' - 4"
A - H1	5' - 5/8"
A - H2	5' - 0"

Use the swing method outlined on pages 13 and 14 to determine all of your curved edges using the radiuses given on your dig spec. →

TIP

There are radius and reverse radius portions of your pool. A radius would form a closed circle on the inside of your pool, where a reverse radius would form a circle on the outside of your pool.



EXCAVATION

TOOLS

Shot stick (or level measuring stick), Transit/Water level, Excavation Digging Tools/Machinery, Rebar Stakes, Hammer, Spray Paint, and String

Once the layout is complete, choose the elevation for the top surface of the pool. If you are using bullnose coping, make sure to note that the top of the coping will also be the top of your finished deck. Normally the surface will correlate with a surrounding walk way, patio deck, or the highest ground elevation of the pool site. The top surface of the pool must be at least two to four inches (2" to 4") above the highest ground elevation to prevent rain and debris from draining/overflowing into the pool. In order to determine the depth of the excavation, you'll need to use the standard calibrated survey shot stick (level measuring stick) and transit or water level. A 2 x 2, telescopic pool pole approximately 10' long, or other similar stick can be substituted for a standard shot stick.

IMPORTANT! Height of standard pool wall is 42" plus the height of your selected coping, which must be added to the wall height to get the accurate total wall height.

In an out of the way place that will not have to be moved during construction, set and level the transit or water level and then locate the highest ground elevation of the area around the pool site. This is done by placing a shot stick at selected areas and marking it at the level indicated by the transit. With a pencil, mark the stick at the point where the transit cross-hairs intersect with the shot stick. When using a water level, mark the shot stick with duct tape at the level of water in the tube. Add two to four inches (2" - 4") to this elevation mark. This will now be your reference point for the elevation of the top surface of the finished pool coping and deck (or the top surface of brick coping). The finished elevation indicated on your dig spec is measured to the top of the pool wall (usually 42" not including the height of the bullnose coping). The dig measurement indicated on your dig spec is usually 42" for the shallow end of the pool and 2" deeper than the finished depth of the deep end of the pool. This does not include the additional height of excavation needed for your selected coping.

Next, measure 44½" above the level mark on the shot stick and mark with tape or marker. This new mark now determines the excavation depth for the shallow end and over dig ledge. Transpose/transfer this elevation mark to a deck, sidewalk, mortar joint on a block/brick wall, or drive a stake in an out of the way place and mark for future reference. The depth of the pool wall footing excavation will be 44½" below this reference point.

A retaining wall may be needed if excessive sloping of the landscape around the pool area prevents the desired finished elevation needed to meet an existing patio elevation.

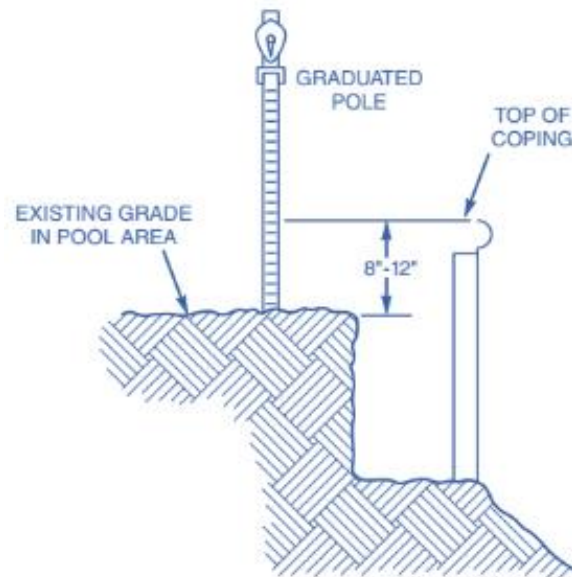
Next, the entire shallow end of the pool is to be dug to the same level as the shelf. This is the 44½" depth, measured from the top of the coping. The first operation is to dig the pool area (including the 2½' wide working shelf/over dig) to a uniform depth of 44½" below the reference point selected as the top surface of the pool. Dig the working shelf/over dig across the width of the pool. Place the shot stick in the hole as the excavator continues to dig until the depth is equal to the 44½" mark. When the 44½" mark is in the level sight of the transit you know that this part of the hole is at proper depth.

IMPORTANT!
Always check and re-check the excavation depth from the reference point during the excavation.

In pools with steps, lounges or similar accessories, the length and width of the over dig must be extended to accommodate each unit and its braces.

TIP

If the pencil mark is above the cross hairs, the excavation is not deep enough, and the pool will be higher than the predetermined elevation. If the mark below the cross hairs, the excavation is too deep and the pool wall will be below the predetermined elevation. If you are using the water level, the water will be below the mark in the tube when the excavation is too high and above the mark when the excavation is too deep.



Accuracy at this stage is imperative and will require less adjustments to the pool walls later.

Repeat the previous steps on marking the Pool Layout in order to recreate the layout inside the excavation area. Remember to leave the 2½' over dig as working space and brace the ledge. This layout needs to be accurate as it will decide the exact position of the pool. Use rebar stakes and paint or flour to mark the outline of the pool.

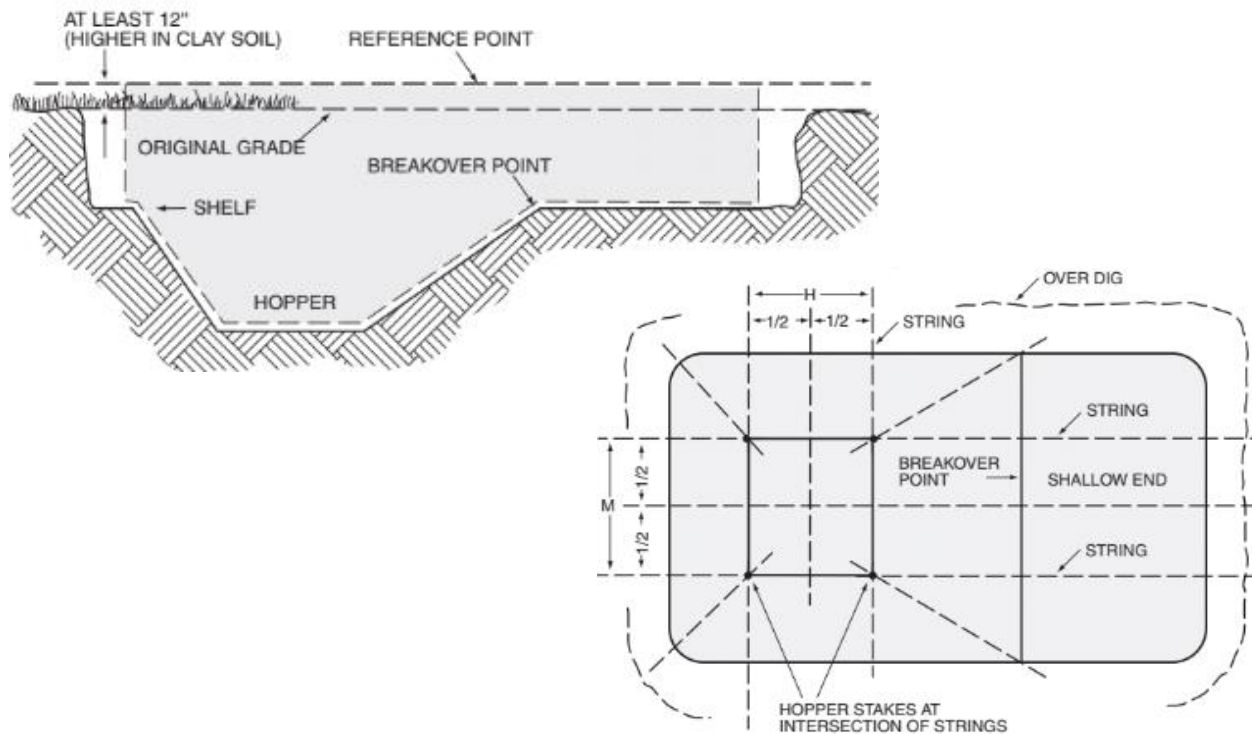
Usually, the last stage of excavation involves digging the hopper (the deepest part of your pool). Hoppers vary in width, length and depth and should be dug according to the dimensions on the dig specification drawing. Generally, installers drive stakes at the hopper corners, transition points and pool wall corners and connect string to them at this time. The string is set at the height of the intended finished grade. Remember, if the pool is to be used for diving, the finished dimensions must conform to applicable codes and standards.

IMPORTANT!

Be careful not to dig into the area outside of the string to avoid an undercut of the 2' ledge. Doing so will remove the supporting ledge for the pool wall panels.

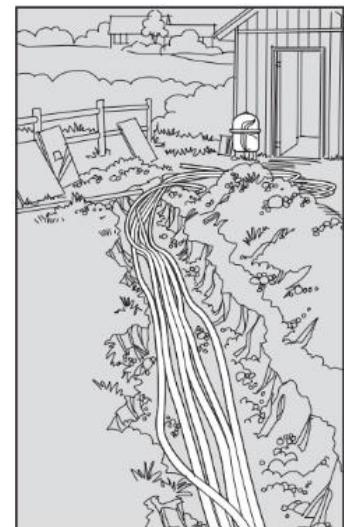
While digging the hopper, the excavator can trim the hopper walls to the proper slope as the final depth of the hole is reached. The excavated depth of the hopper is 4½" deeper than the finish dimensions of the pool. This allows for 2" of sand/vermiculite pool base on the bottom and the 2½" coping (actual coping height can vary. You should measure the actual height of the coping supplied with your kit).

Refer to the swimming pool dig spec drawing for your specific pool size for the total excavated depth of the deep-end. Your dig specs (also called panel layout) were sent and approved during your ordering process and should have also been emailed to you along with this guide. The dig spec shows the depth measured from the top of the pool wall. If you are using bullnose coping, you'll need to add an additional 2½" of excavated depth from the top of the coping or *finished elevation*. The finished measurement shown on the dig spec is the measurement from the pool floor to the liner track or top of the pool wall.



Check the hopper/deep end of your pool to make sure it is squared as you proceed from the hopper toward the shallow end. To square the hopper, measure the diagonals/slopes. If the diagonals are equal, the layout is square.

A trench for plumbing tubes from the pool to the planned filter location can be dug at this time. The excavator should dig the plumbing trench at a depth of at least eighteen inches (18"). It should reach from the pool over dig to the equipment pad. This will save digging by hand later!



SET PANELS

TOOLS

Possible Tools: Drill, Rope, C-Clamp, Rebar Stakes

Set the wall panels on the over dig supporting ledge (also known as the panel shelf) leaning them back against the side of the excavation in the proper order as shown on your dig spec. Be sure to place the skimmer and return inlets in the desired locations.

TIP

The step takes the place of any wall panel of equal size on the dig spec.

TIP

Panels of the same size and radius are interchangeable

THE SKIMMER AND RETURN INLET PLACEMENT

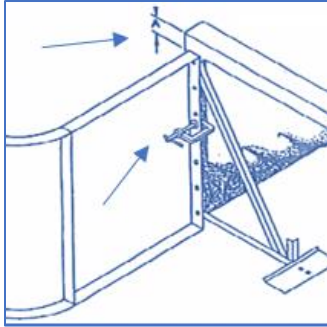
The desired placement of the water recirculation inlet fittings (returns) and skimmer may be marked on the swimming pool construction plan. It is best to place the skimmer near the center of one of the long sides of your pool and downwind of the generally prevailing breeze direction experienced in this area. This will enable the wind to help direct surface dirt and debris to the skimmer for removal from the pool! Pools with 2 skimmers can locate them on the same side or on opposite corners. In addition, thoughtful consideration should be given to the circulation pattern of the water when placing inlets. Strive to eliminate all dead spots in corners by evenly spacing the returns for maximum coverage.

On diving pools, a safety rope with floats must be anchored to each side of the pool a minimum of one foot, but no more than two feet, into the shallow end from the breakover. With that in mind, be certain that the skimmer opening will not be in line with or near the rope and floats.

NON-VINYL COVERED STEPS

For vinyl overlay steps, see Appendix C on page 59.

When using steps, individual manufacturer instructions should be followed for proper installation procedures for the step ordered with your pool kit. The step instructions are attached to the steps along with the faceplate screws. When deciding where to place your step, keep in mind that step(s) should not go past the shallow end breakpoint.



← Position the step unit in its desired location within the pool frame. Temporarily secure the step flanges to the wall flanges with C-Clamps as shown here.

Working one side at a time, adjust the position of the step to ensure that the top of the step will be level with the top of your coping (NOT the top of your wall panel). This level can be equal or slightly greater than the maximum height of the coping that will be used.

- **Bullnose Steps:** The top of the step should be flush with the top of your bullnose coping. Since actual coping size can vary you should measure the coping or actually place the coping on the wall before drilling the attachment holes.
- **Cantilever Steps:** The top of the step should be flush or slightly higher with the top of the wall panel.

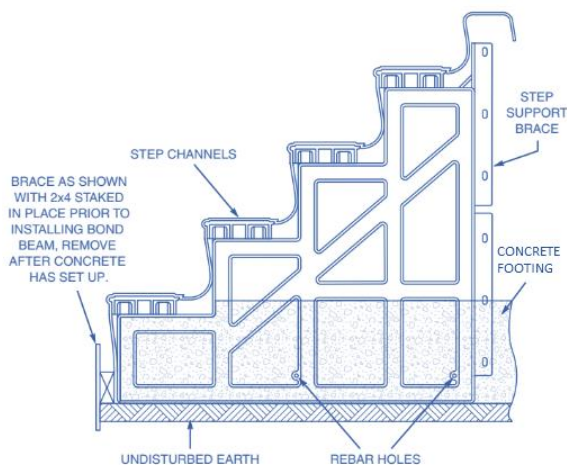
Once your step is aligned correctly in relation to your wall panels, clamp the step in place securely. Using the holes in the wall flange as a template, drill matching hole into the step flange. Secure the wall panel and step together in these locations with bolting.

IMPORTANT! The bolt heads, with an oversize washer under them MUST be on the step side of the flange assembly.

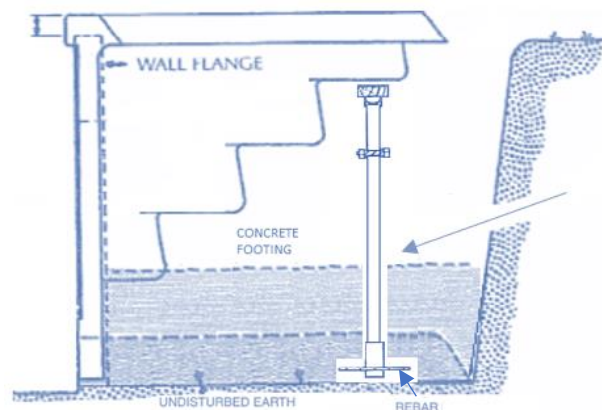
The back of the step must be supported. Supports can also be used to level the step as well. The step should be leveled to the same slope as the deck which will slope away from the pool.

Step supports typically come in one of two forms: A Brace or a Pole

BRACE STEP SUPPORT



POLE STEP SUPPORT



For Pole Support Steps: Drill a hole through the PVC support leg and install a rebar stake horizontally so that it will be set in the footing when the concrete is poured.

Step Installation items that are to be completed later in the install process:

- When adding Coping: Install coping so that it is flush with the step on both sides. Care in this step will prevent a lasting blemish that cannot be eliminated once the deck treatments are complete.
- When Backfilling: Backfill the step unit, same as the pool walls, taking extra care to eliminate voids under the steps by compacting the backfill.
- When Pouring Concrete: Be sure to pour concrete behind the step as well. To keep the step straight when pouring the concrete footing, place a 2 X 4 or a 2 X 6 across the lower front length of the step section (inside the pool) securing it with stakes. If using cantilever foam forms, see page 30.

Steps and swim outs are installed in the same manner.

STEEL OR POLYMER WALL PANEL ASSEMBLY

TIP

Steel and polymer wall panels are assembled in virtually the same manner. The major difference is that polymer panels require every bolt hole filled whereas steel panels have additional bolt holes (located further away from the wall panel) for steps. These “step bolt holes” *do not* need filled if you’re not using that wall panel for a step connection.

Begin at any corner, (or arc for radius pools). Begin connecting the panels and braces using the non-corrosive nuts and bolts provide; use only the inside bolt holes. Where two sections are joined, attach the adjustable A- brace "L Bracket" to the first or second hole of the panel flanges. **Do not put the brace bracket/member between the wall panels.**

IMPORTANT!

Do not put the brace bracket/member between the wall panels!

Do not over tighten the screws!

Do not use wrenches; hand tighten in this step.

Next, attach the adjustable A-brace to one of the bottom holes of the panel flange. A nut and bolt must be used in every flange hole for polymer panels. When tightening the panels joints, make sure that the top and front facing (inside of the pool) portion of these panels are flush/level with each other once joined. The backside of the panels do not need to touch and may not; this is common due to design. Hand tighten the top and bottom bolts first while checking for proper alignment. When the panels are flush, hand tighten the remaining nuts and bolts. Use the corner to help stabilize the entire wall assembly by alternating the panels assembled in each direction/side. Use stakes and rope to hold the straight wall panels straight during construction if needed.

TIP

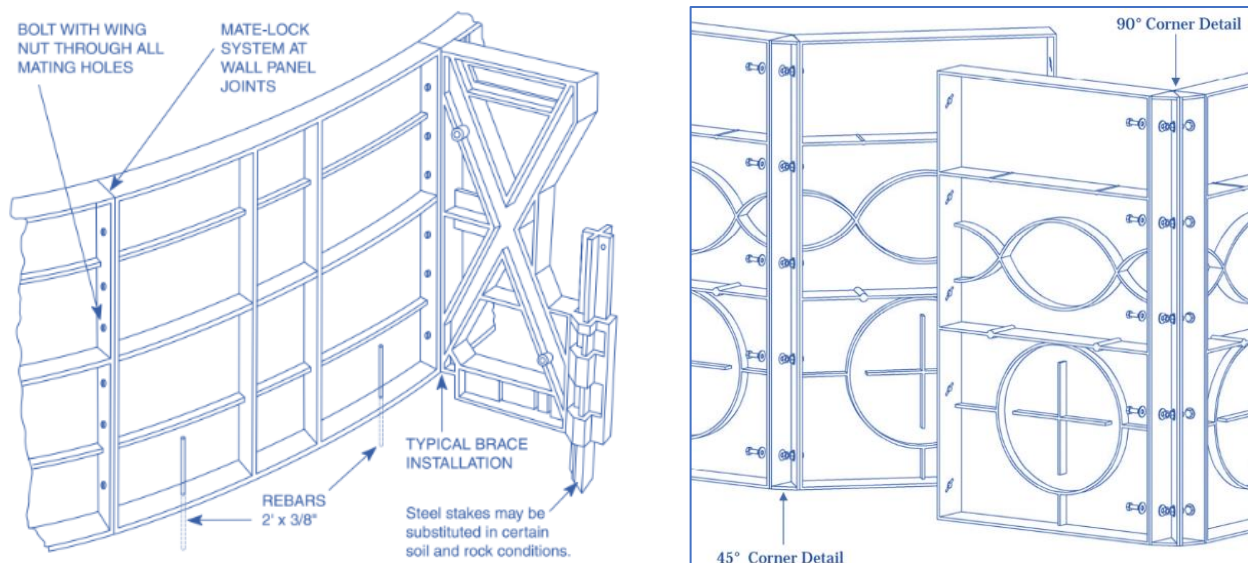
For Steel Wall Panels: The use of A-frame braces is *optional* where a rectangle corner panel connects with a straight wall panel.

The corner A-frames are not included unless they are ordered with the kit.

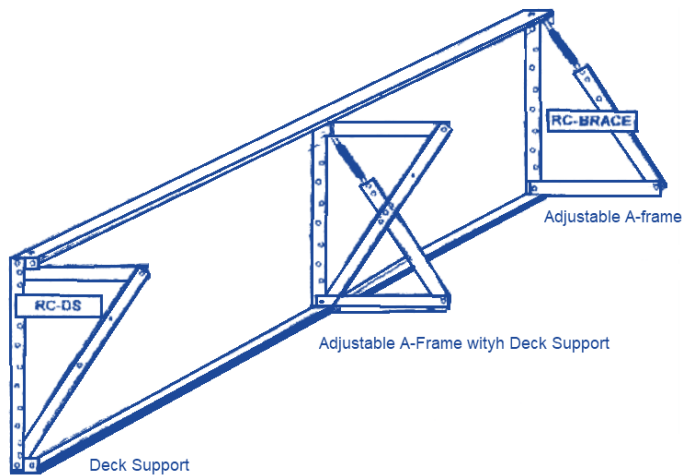
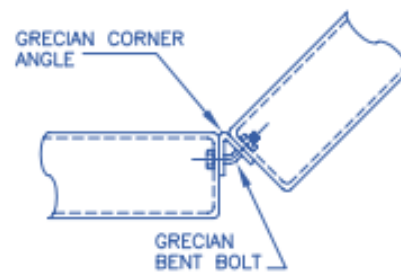
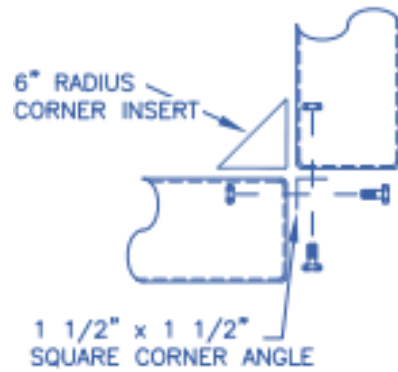
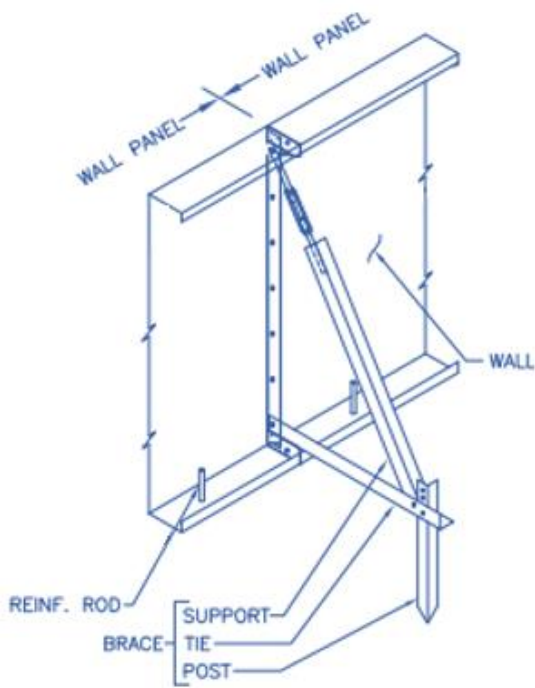
Once the panels are all assembled, your steps are in place (if applicable), and there are no further adjustments needed, you can now go back and tighten all the bolts at the panel joints. Be careful not to over tighten them as this can cause the panels to be pulled from their current placement and thereby change your measurements.

EXAMPLE OF A POLMER WALL PANEL WITH BRACE

*If using radius polymer panels with flex design, see Appendix A: Polymer Panels on page 57.

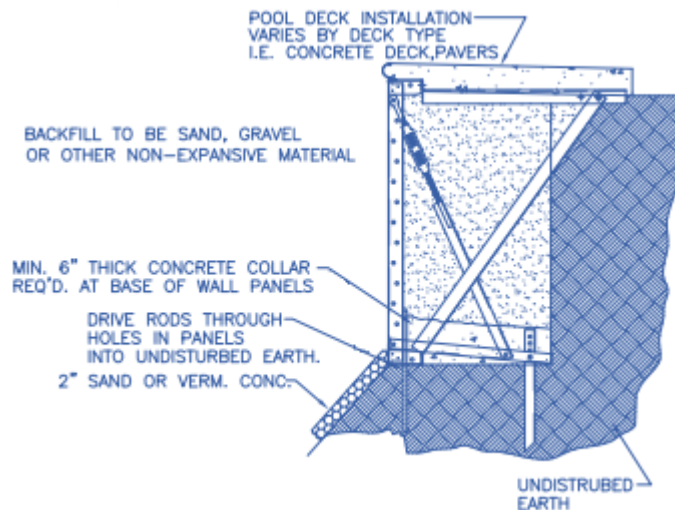


EXAMPLE OF A STEEL WALL PANEL WITH BRACE



← This image shows how your Deck Support and A-frame brace connect to your wall panels individually. These two pieces do not connect to each other but can be used on the same panel for added support.

This image showcases a completed pool. Notice that if using a deck support, there is a bit of the undisturbed dirt cut away at the surface. This is to provide additional support to for your deck. →



SQUARE, LEVEL, AND MAIN DRAINS

TOOLS

Rebar stakes, Hammer/Mallet, Tie Wire, Duct Tape, Measurer, Transit/Water Level, String, Screwdriver, PVC glue, Excavation Tools

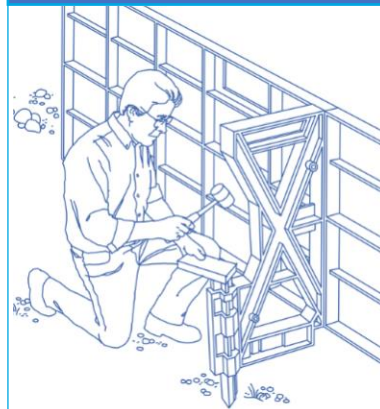
SQUARING THE POOL WALLS

After all pool walls are assembled, *for rectangle pools* you'll want to measure the completed pool wall assembly to insure it is square and parallel. Do this by measuring the inside length and width for your pool. Also measure both diagonals for straight wall pools and the steel check for radius pools. An easy way to achieve squaring is by setting an alignment string along the bottom length of the pool wall, and straightening a long wall first. Recheck the widths of the pool at the corners. Then measure the diagonals of the pool corner to corner. When the dimensions are equal, the pool is squared. Straighten the remaining walls.

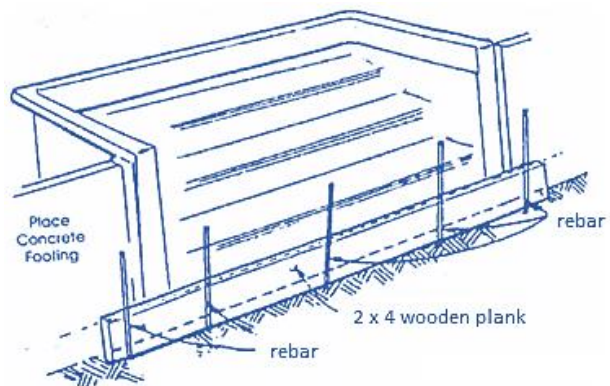
When the wall assembly is square, starting in the corners drive half of a rebar stake through the holes in each bottom flange and into the shelf. (Put rebar on the inside or outside of radius panels). Depending on the rib configuration of the panel, the rod may need to be angled slightly to allow access for a hammer to strike it. The rod helps keep each panel properly positioned. While holding a level on its face, verify that the wall is plumb and drive the stake home. Fix its position by threading a 3/8"-16 x 1" bolt through existing or newly drilled holes in the socket and stake. Lock the bolt in place with a nut. Make sure the walls remain plumb.

If you have not done so already, brace your step(s). Use a 2 x 4 wooden plank and rebar to hold the step into place. This will assist in keeping your step in place when it comes time to pour the concrete footer.

TIP



Some braces and/or soil conditions require the use of treated steel stakes. Low air temperature and/or firm soil may require the use of a wooden block or durable cap to be placed over the top of the stake while driving it home.



TIP

Remeasure diagonals, and/or steel check to ensure that your measurements have not changed prior to pouring the concrete footer. If measurements have changed something is amiss and will need to be adjusted.

LEVELING THE POOL TO THE PREDETERMINED ELEVATIONS

Check the level at each panel joint, steps, swim out and at each of the corners. Level the pool walls with the transit or water level using shims under the pool wall as necessary. (¼" amazonite, ½" to 1" treated wood cut in 4" X 6" squares, or 2" patio blocks or bricks will all work well for shims). This procedure is very important and plenty of time should be devoted to ensure a perfectly level pool. Following the leveling procedure, straighten the pool walls using the adjusting rods of the A-bracing system. For non-adjusting X-braces, plumb the panels while pouring the footing later. To achieve a straight sight line and plumb walls, stretch an alignment string along the top of the pool walls from corner to corner, on each straight section of wall.

TIP

Installation of the Main Drains are optional. If installed it must be done *before* pouring the concrete footings. Two main drains must be used as shown below for safety or no main drain can be installed. If not using main drains we suggest using two skimmers instead.

MAIN DRAINS

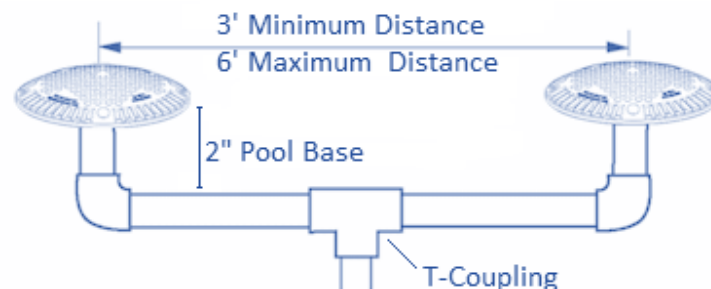
If using main drains, it is easiest to assemble the drains together prior to placing them in the floor of your pool. Using only the main drain bodies (leaving off the gaskets, trim rings and drain covers) connect the two main drains using 1½ "or 2" SCH 40 PVC with a T-coupling in the middle of two pieces of pipe 18"-36" long each. Use the side connection holes to connect the pieces. Placing the drains upside down on a flat surface will help to make sure they are mounted and connected evenly and won't rotate when you install them in the pool floor. Using the provided threaded plugs, glue them into the threaded holes located in the bottom of the drains with PVC glue.

IMPORTANT!

The two main drains must be at least 3' apart, but no more than 6'

Normally, your main drains should be centered in the hopper. You can position them differently if you wish, but maintain the required distance.

- Dig a hole 12" deep, and about a 6" wider than the drain assembly. Position the drain assembly and temporarily secure to the ground with rebar and tie wire at your desired position.
- Make sure to set the height of the drain assembly to your *finished* floor dimension (refer to the dig spec). This is done to the top of the drain body and not the trim rings/drain covers.
- Make sure to level both drains (front and back) to the finished floor dimension.
- In order to protect the drains and screw holes from debris and concrete, you'll want to duct tape over the top of the drain bodies.
- Dig a trench (wide/deep enough to fit the entire pipe) from the center of the assembly at the connecting T, across the hopper, up the hopper wall, and under the pool wall that is closest to the filter system. Run the pipe through the trench, under the pool wall, and stub up above the expected level of the concrete footer for the wall.
- Cover the end of the pipe with tape or a pipe cap to prevent concrete from entering the pipe when pouring concrete later.
- Fill in the remainder of the hole around the drains with sack crete up to about 2" below the top of the drains. Typically, this is about even with the excavated pool floor around it. This will lock the drains in place, and prevent movement in the event of some minor settling or muddy ground conditions as well as many other problems associated with drain movement.
- You can wait to do this in order to use the same concrete that you are using for your footer if you wish but be careful that the drains do not get moved in the process.



INSTALLATION OF THE COPING

TOOLS

Drill, 5/16" hex head bit, Hacksaw, Trowel/Shovel

You'll want to start by installing all pre-bent and corner coping sections first with the self-tapping screws provided. During the installation process, make sure that the coping lip fits snugly against the face or top panel. Screws should be driven at 1 ft. intervals; a drill with a 5/16" hex head bit works best for driving these screws through the coping and into the pool panel.

IMPORTANT!

If you have foam form coping refer to page 30

TIP

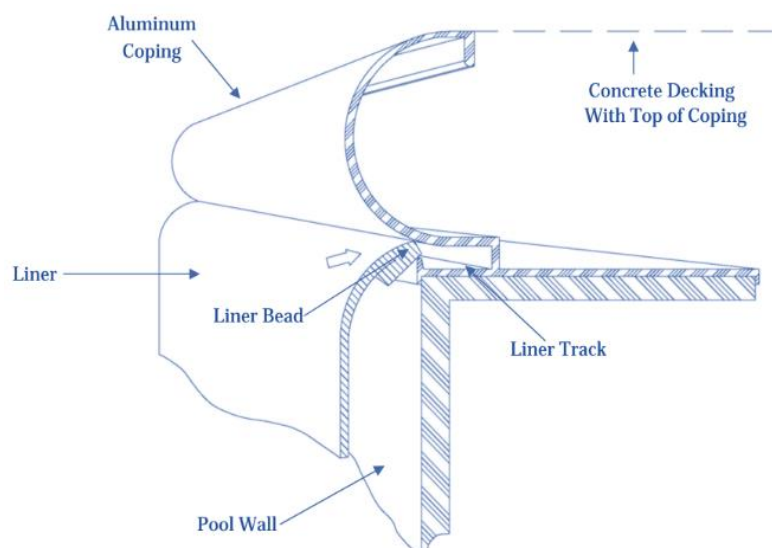
Every installation will require cutting your coping. Corner sections next to a step may have to be cut and hand trimmed in order to fit snug next to the step. Cutting the straight pieces of coping may be necessary when fitting them into place as well.

BULLNOSE COPING

After the corners are secured, screw the long lengths of coping in place in the same manner. Make sure the liner receptacle on the lower edge of the coping is flush with the top inside edge of the pool walls. Included with the coping are 2" wide coping clips to use to cover coping joints. These clips must be placed before the concrete deck is poured.

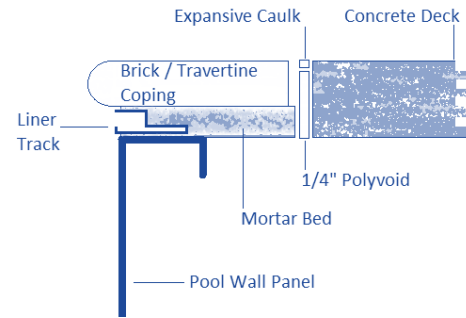
The coping provided with the pool has a dual purpose of acting as a receptacle (liner track) for retaining the liner bead as well as serving as an edge against which the concrete is poured.

This image shows rounded bullnose coping. Flat-face bullnose coping comes in two styles. For flexible flat-faced coping (FCW or FCG), notice that these pieces are straight even for your corners as these *bend* to fit the desired radius of your pools form, hence "flexible" foam forms. These will also come with tethers which are typically placed where joints connect in order to stabilize the coping however they can be place anywhere needing additional stabilization. See Appendix for tether imaging.



CANTILEVER COPING/FLAT TRACK BEAD RECEIVER

If using cantilever/flat track coping use the notched pieces (or pre-bent pieces) to bend around the radius or radius corner. The screws should be fastened every 12" (as a rule of thumb). It is important to have the track flush with each added piece of coping added. After the corners are secured, screw the long lengths of coping in place in the same manner. Make sure the liner receptacle on the lower edge of the coping is flush with the top inside edge of the pool walls. The track holds your liner in place. If using bricks, stone, travertine, etc. see the above diagram for an example of a commonly constructed deck design.



CANTILEVER COPING WITH FOAM FORMS

Due to the fragile nature of foam forms, we send additional pieces with your order. Trimming the edges of each piece may be required.

After following the guidelines for Cantilever Coping, refer to the IMPORTANT! Bubble to the right.

Once all other steps are complete and you are ready to prepare the bottom of your pool, (without your liner installed yet), peel the paper from the double-faced tape and stick the form to the panel with the form bead and plastic clips filling the liner opening. This form bead keeps the liner clean during the pour. The plastic clips snap into the track locking the form in place every six inches. When attaching the form to the panel, be sure to use the palm of your hand making sure that the tape bonds well.



For additional insights on foam forms please watch, <https://www.youtube.com/watch?v=Csr0YsuV1ho> or Youtube "Stegmeier Foam Deck Forms Installation".

For additional information on foam forms for steps, please watch <https://www.youtube.com/watch?v=oUVu3KPC-Jo> or Youtube "Stegmeier Foam Step Forms Installation".



IMPORTANT! If using foam form coping, bottom preparation and liner installation become the last steps in completing your pool. Continue with "Pour the Concrete Footer" in this guide but look for another IMPORTANT! Bubble on page 37. Come back to this section when you are ready to prepare the bottom of your pool. (Does not apply to Automatic covers.)

POUR THE CONCRETE FOOTER

Check the wall panels one final time for proper level. To avoid the concrete footing (bond beam) from running under wall sections and protruding into pool excavation, be sure to fill any voids under the wall with dirt. Place the concrete behind the wall gently being careful not to direct the flow of concrete directly at the panels. A little extra care and patience at this stage is recommended. Extra concrete should be concentrated at the A-Frames and corners.

Pour a minimum 2500 PSI - $\frac{3}{4}$ " stone concrete footing mixture (pea gravel stone is also suitable for this job) around the entire pool panel perimeter, at a depth of 5" to 7" and at least 30" wide. Footers deeper than this are unnecessary and may result in bowed or crooked walls.

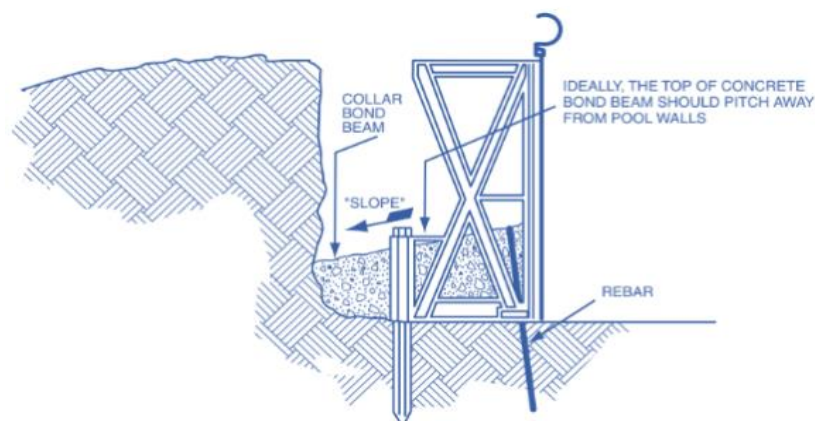
TIP

Smoothing out the footing with a trowel or shovel will provide more suitable bedding for the plumbing to set upon.

AMOUNT OF CONCRETE NEEDED

POOL SIZE	YARDS OF CONCRETE
12 x 24	3½ Yards
14 x 28	4 Yards
16 x 32	5 Yards
18 x 36	6 Yards
20 x 40	7 Yards

You'll want to make sure to order an extra $\frac{1}{2}$ yard for each step/swim-out. For the pad for the filter, pump and heater, take the square footage of the desired pad size and divide it by 30. Add that number to the yardage required in the table to get the most accurate amount of concrete. For example: If the size of your pad needs to be 40 square feet, divided by 30 that would equal 1.33. You would add 1.33 yards to the number of yards of concrete shown in the table for your specific pools size.



Pre-Installation of the Skimmer, Return Inlet Fitting, Underwater Light, & Rope Anchors

TOOLS

Screwdrivers, Drill, Saw

INSTALLATION OF AUTOMATIC SKIMMER

Align the skimmer with the drilled panel holes. Fasten to wall with the two pan (or slot) head securing screws in the center of each side. Place gasket on the skimmer face. Make sure that the holes in gasket align with the holes in skimmer face. (A very light application of adhesive cement will assist in holding gasket in place.) Insert two faceplate screws, without the faceplate attached, at each top corner of the skimmer opening. This is to make it easier to locate screw holes *after* installing the liner.



PREPARATION OF RETURN INLET FITTING

At the predetermined locations, use a jig saw/hole saw (attached to a drill) cut or drill a 3" hole in the pool wall 12"-18" from the top of the pool wall to receive the inlet fittings. Take care in selecting the inlet position to avoid structural ribs on the back of the pool wall. Install the inlet fitting as shown in manufacturers illustrations (should have been included in its packaging). Remove the direction jet/eyeball, the four faceplate screws, and the faceplate itself, thereby exposing the liner sealing gasket. Insert two faceplate screws, without the faceplate attached, to once again aid in locating screw holes after the liner installation. If return inlets are to be installed in the steps, drill a 2 $\frac{3}{8}$ " hole (two and three eighths) in the flat area on the steps. The step area should be smooth before installing the gasket (with sealer) and inlet into the step.



← Notice that if you ordered step returns that you will have two different types of return inlets; one with screw holes and one without. It is imperative that you only use the inlet *without* on screw holes on your step(s). This only applies to none liner overlay steps. If your step(s) have a vinyl overlay then you will only be using inlets with screw holes for your pool.

IMPORTANT! Make sure that you are using the correct inlet. Vinyl liners and vinyl overlay steps only use the vinyl inlets (with the screw holes). Using the incorrect inlet can cause leaking and make your liner nearly impossible to replace in the future.

INSTALLATION OF UNDERWATER LIGHT

Local code must be consulted concerning electrical connections. Underwater lighting fixtures and fixture housings must be installed under the provisions of Article 680 of the current national Electric Code handbook. When installed with the proper niche according to Article 680, both 12-volt and 120-volt fixtures will require additional safeguards. These safeguards include either differential circuit protectors or GFCI ground detectors. For specific underwater light installation instructions, please refer to your individual manufacturer's instructions.

For niche lights, the precut/molded light hole in the wall panel must be installed so that the light will be located near the bottom of the pool. Once again, before installing the liner, install the niche with gaskets in the wall panel with the holding screws. Insert 4 faceplate screws into the niche, without faceplate. This will help locate screw holes after the installation of the liner.

IMPORTANT! In order to replace your niche light in the future as needed, make sure to leave 3'-4' of excess cord inside the light housing. This will allow you to pull the light up onto the deck instead of having to drain your pool in order to reach the light.

For additional information on niche lighting, visit <http://www.royalsswimmingpools.com/blog/how-to-install-an-inground-pool-light-and-niche/>

TIP

Niched lights are water cooled which means that water *will* get into the housing. On the back of the niche is a conduit tail that will need to be *water tight*, until the conduit is above water level to prevent your pool from leaking.

Inlet lights, such as the most common Hayward 320's, are installed like a return inlet fitting. Your pool configuration will determine the locations of your inlet lights. You will need a hole saw to cut into the wall panels for the location of each inlet light. These lights can be installed almost anywhere in your pool, however keep in mind that most lights require a minimum of 4" of water above them.

TIP

The higher your lights are on your pool wall, the brighter they will appear on the surface of your pool. It is recommended to have higher placed lights directed away from the main seating area around your pool in order to avoid an uncomfortable amount of light shining in that direction.

INSTALLATION OF ROPE ANCHORS

National Swimming Pool Institute residential and commercial code requires the installation of a safety rope designating the change of the pool bottom from the shallow end to the deep end (also known as the “break”).

To mount the oval rope eye to the coping, drill small holes in the coping 12" back from the break in the direction towards the shallow end and secure the rope eyes with sheet metal screws.

IMPORTANT! The safety rope must be installed at surface level, 12" back from the break in the direction towards the shallow end.

Rope anchors sent are based off of the coping that you ordered:



Standard bullnose coping will have a rounded oval rope eye to fit securely on the rounded coping. This will be mounted directly onto your coping.



Flat faced coping will have a flat oval rope eye to fit flush with your coping. This will be mounted directly onto your coping.



Pools that have automatic covers, or cantilever coping, we provide a vinyl liner rope eye. (This type of anchor must be installed at the same time as skimmers and return inlets).

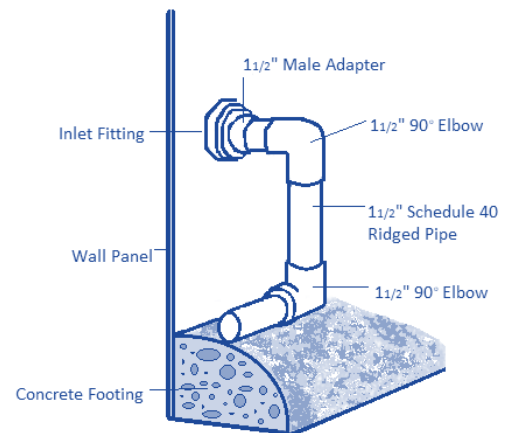
*The specific design of rope anchors may vary



PLUMBING

Best types of plumbing to use is either rigid or flexible PVC schedule 40. Flexible PVC pipe is available from royalswimmingpools.com. It is recommended to use rigid PVC for all out-of-the-ground-plumbing at the equipment pad for a more professional appearance. Rigid sch 40 PVC pipe is available from any hardware store.

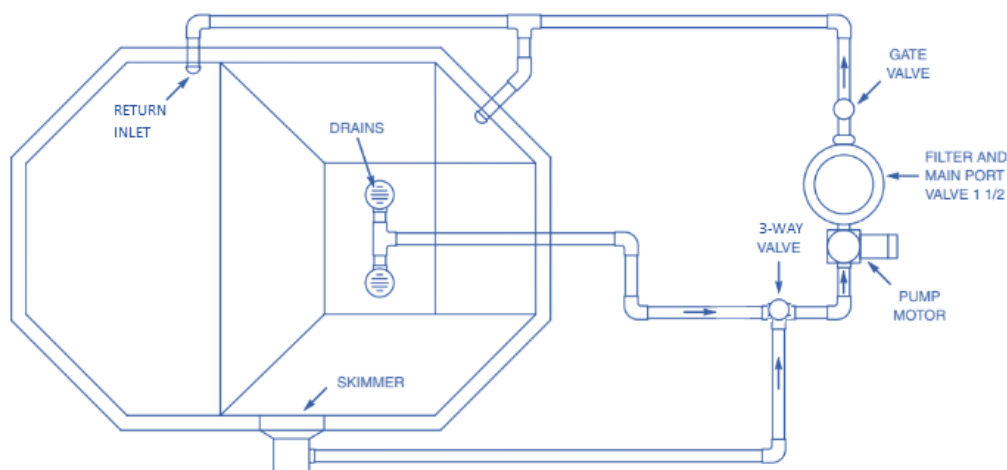
Before starting, coat the concrete footings with about 2" of clean sand or dirt to cushion the plumbing. Start plumbing at the back of the inlet fitting. Apply Teflon tape or Permatex #2 to a 1½" male adapter thread and thread it in the back of the inlet fitting. Hand tighten the male adapter, and then finish tightening with a wrench. If no threads are in the return, glue the pipe in the return. Plumb out of the inlet and down to the footing as shown in the diagram. Plumb the other inlet fitting in the same manner.



TIP

Return inlet lights (such as the Hayward 320) requires 6"-12" of straight pipe from the adaptor to the elbow, debating on the light model.

Use 1½" T-couplings to join the return inlet pipes. At the approximate midpoint between the inlet fittings, put a 1½" tee fitting and continue plumbing to the equipment pad. This will allow for equal water pressure at each return fitting. Plumbing the skimmer follows the same procedure as the returns using 1½" or 2" PVC. Plumb the main drain line to the equipment pad. Before the final filling of the pool with water, all of the plumbing to the equipment pad should be completed to a level at least as high as the top of the pool wall to prevent water from overflowing through the pipes when filling the pool. A separate 1½" PVC line should be ran to

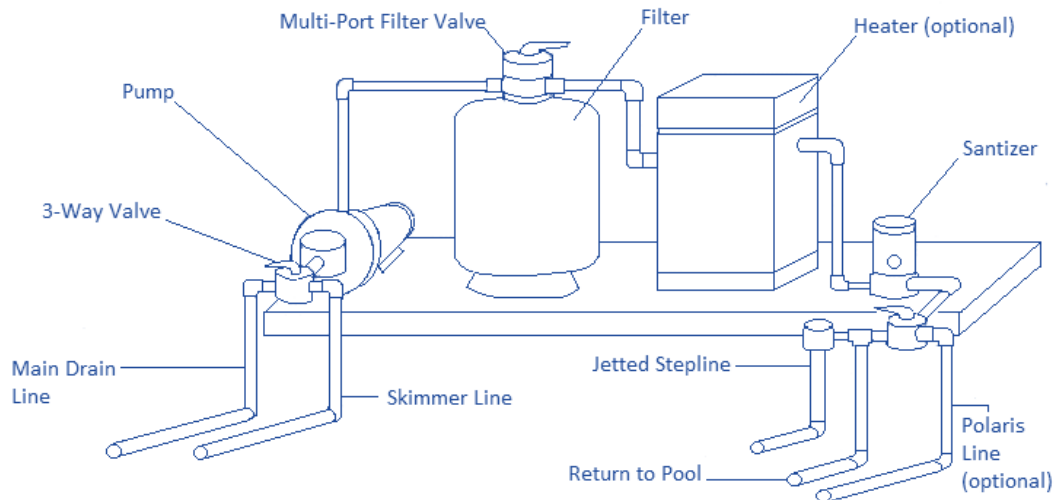


to the equipment pad for the Polaris auto-cleaner. A separate 2" PVC line should also be ran to the equipment pad for spa jetted steps or spa jetted swim outs.

EQUIPMENT PAD

For plumbing of the filtration equipment please refer to the illustrations for a general layout and sequence of the equipment, keeping the following in mind:

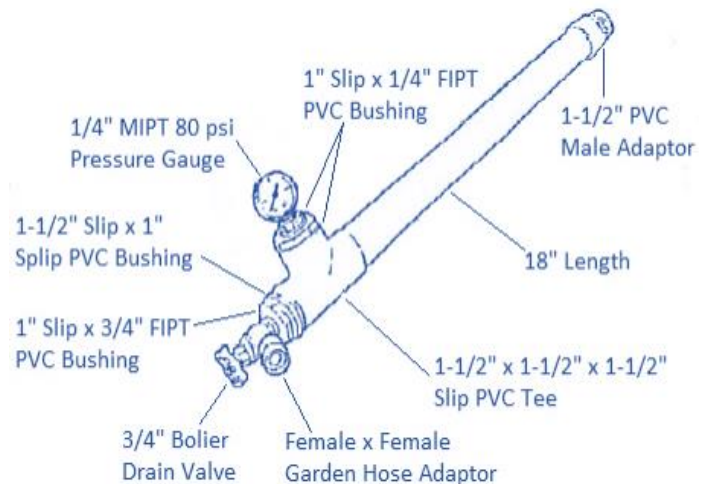
- Two regular ball valves can be used in place of one three-way valve
- Pressure testing of the plumbing lines before backfilling is highly recommended



Once the equipment has been plumbed, your electrical contractor can complete the electrical connections for the pool pump and underwater light. All electrical connections must be done by a certified electrician in compliance with local and national electric codes.

TESTING THE PLUMBING FOR LEAKS

First construct a pressure test device as illustrated. Apply Teflon tape to the test device and insert it into the top of the skimmer. Place the multiport filter valve on the filter. Hook up a garden hose to the test device and turn the water on allowing the plumbing to fill with water. When water comes through the inlets, shut off the water and plug the inlets with 1½' PVC threaded plugs or rubber plugs. Turn on the water until the pressure gauge reads 15-30 psi. Shut off valve on the test device and watch the pressure gauge. If the lines have a leak, the gauge will show a drop-in pressure (usually very quickly). Visually inspect all pipes and fittings for drips or leaks of any kind. Repair and replace plumbing where necessary. Release the pressure in the system before removing any plugs.



IMPORTANT! If you are installing a cantilever deck using foam forms you must skip to step “Backfilling the Pool” on page 50. Only return to “Bottom Preparation” (below) after completing the deck. (Your cantilever deck using foam forms must be complete before installing your pool’s liner so refer to page 30 if needed)

Optional: If you are using bullnose coping or flat track cantilever coping with bricks or stones you may also skip to step “Backfilling the Pool” on page 50.

BOTTOM PREPARATION

TOOLS

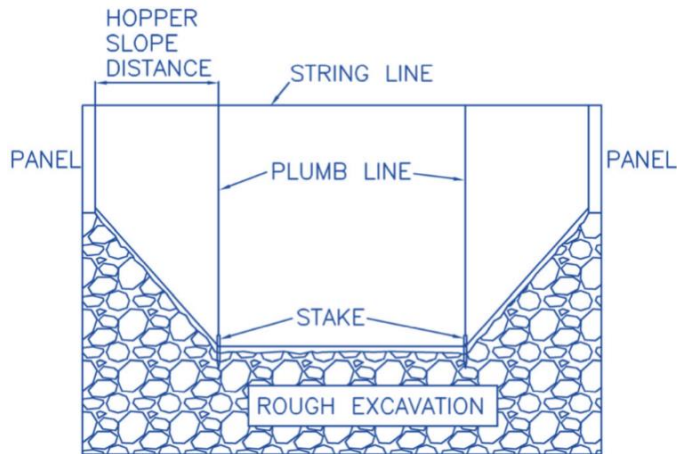
Measurer, String, Rebar Stakes, Hammer, Duct Tape, Saw, Tamping Tool, Shovel, Wheelbarrow

RESETTING POOL FORM DIMENSIONS

Once the footing has been poured, check the depth in various sections of the pool bottom (including the hopper/deep end) in relation to the top of the wall. If the excavator has worked carefully, the pool floor should be close to the exact depth of excavation; leaving only a small amount of hand trimming to be necessary. Remember, the depths may be up to 2" deeper than the dig measurements on the dig spec but may not be less than the dimensions shown on the dig spec or over the 2" deeper mark. Extra depth will end up helping with the liner fit, especially when installing the liner in temperatures above 85°F. The final sizing of the pool bottom determines the smooth future appearance of the liner in the finished pool.

Moving forward, disregard the “excavation dimensions” of the hopper as you will need to reference the “finished dimensions” on your dig spec from here on in. The finished dimensions allow for 1 to 2" of sand mix or vermiculite pool base and provide an accurate guide for your troweller when finishing the pool bottom.

The hopper dimensions are intentionally 2" less than the excavation dimensions. This is to allow for 2" of pool floor material (sand or vermiculite mix). Remember that the finished depth shown on the dig spec is from the liner track (top of the wall panel) to the top of where the sand/vermiculite bottom will be.



TIP

If you run string across the top of the coping to check for accurate depth, don't forget to remove the height of your coping from the final measurement.

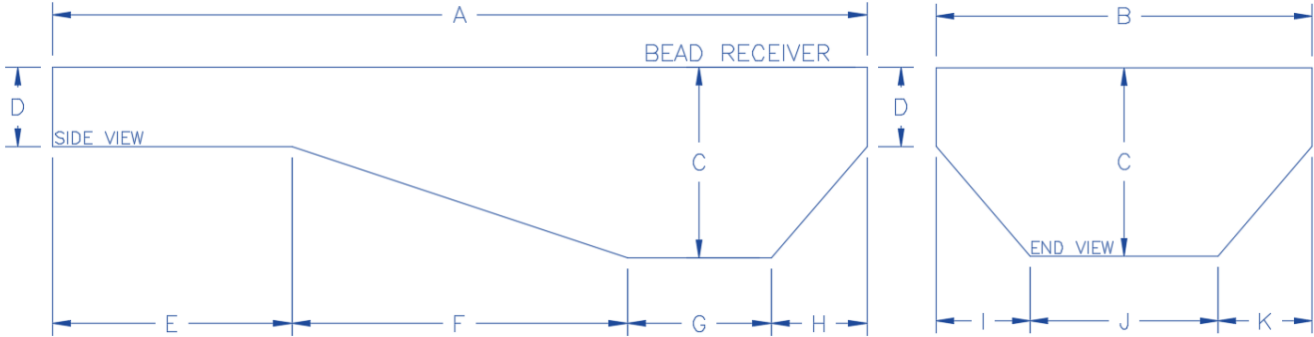
INSTALL FOAM WALL (optional)

Pool Wall Foam is a great way to provide a cushion AND layer of protection between a pool wall and the pool liner. It can also provide a small amount of heat insulation when a heater is used with your pool. The protective barrier provided by wall foam can help prevent punctures and tears due to anything getting caught behind the liner.

Using duct tape, tape the pool wall joints to prevent air from leaking through the joints while the liner is being vacuumed into place. Tape should extend from the bottom edge of the coping down to the bottom of the panel. Use spray adhesive (as per the instructions on the can) to apply the optional wall foam to the steel walls. Cutting sections from the roll of wall foam before applying the adhesive will make installation easier.

LAYOUT OF FINISHED DIMENSIONS

Use the diagram here for reference in the following steps on the next page. Start the finished dimensions layout at the shallow end, working your way towards the deep end.



1. "E" distance marks the end of the shallow end floor and the beginning of the slope down into the deep end/hopper. The point is also called "the break". Using your dig specs as reference, set 4-9 stakes/pins in the shallow end of the pool. Make sure to have one stake in each corner near the wall panels and 2-3 stakes along the E distance starting from the shallow end wall to the break. Tie a string on each pin across the width of the pool and length of "E". You may also run strings diagonal across the shallow end from one corner to its opposite break. Tie the string at the height of 2" up from the bottom of the wall panel (or 40" down from the top of the wall if you prefer). This will be the height of the sand mix on the steel panel for the shallow end.

2. Measure the distance of "F" (starting from the break) and set a stake near the bottom of your wall panels on each side of the pool. Now measure distance of "K" away from each wall at the F stakes. The measurement must be taken horizontal or level, not at an angle. A plumb bob may be used or simply drop a rock or rebar stake to locate the beginning of the hopper pad. Drive the rebar stake into the ground at this mark with a hammer. This is now the end of the slope which defines the width of the hopper side walls as well as the beginning of the deep end, pad "J".

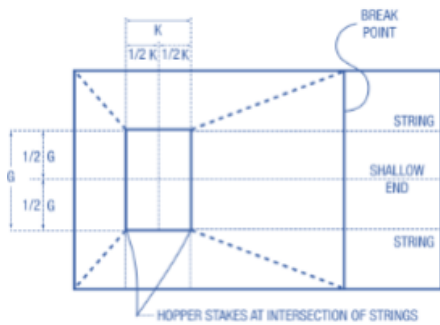
3. Next, measure the distance for "H" (from the deep end wall toward the hopper pad) and set another rebar stake on each side wall. Repeat the above procedures for the end of the back slope "G".

4. Tie string across the width of the deep end at the top of the pool wall or coping. Measure from the string down to the rebar stake and mark the string at measurement "C". If your string is on top of the wall panel, your measurement should be equal to the dig specs finished depth. If your string is on top of the coping, make sure to use the dig spec finished depth plus the height of your coping for an accurate measurement. For example: If your dig spec shows a depth of 8' finished depth it means 8' from the top of the pool floor up to the liner track. If your coping is 2½" and your string is run across the top of your coping then you will measure 8' plus 2½". This now defines the depth of your pool. The top of the string is the finished depth of the deep end/hopper (J & G). The depth can be made up to 1"-2" deeper than shown on the dig spec but never less than measurement of "C".

5. Tie string from the stake at the break, down to the stake at the bottom of the slope, and up the side slope to the "F" stake. Tie string around the perimeter of the deep end floor and diagonally from stake to stake. Set these strings at the finished depth marks. These are now finished grade strings.

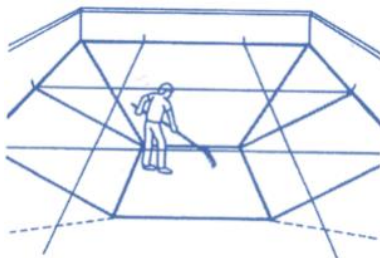
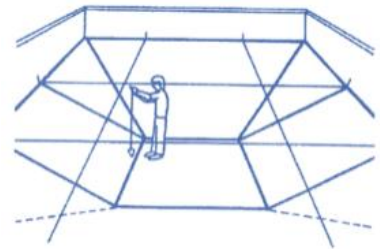
TIP

Finish Grade Strings are tied around all of the finish points marked on the rebar stakes in order to map out the bottom and create a visual of each section to make the finishing process easier.



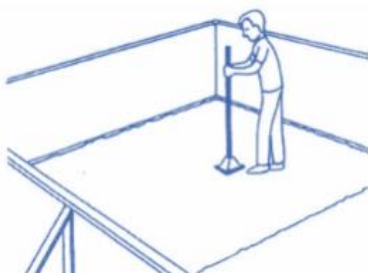
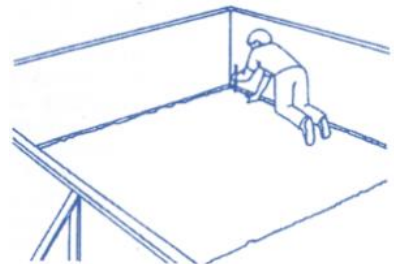
← Locate the sides of the hopper pad by stretching parallel strings from the break point to the end wall. At the same time, locate the front and back of the hopper pad by stretching strings between the sidewalls of the pool.

Find the finish grade by dropping a plumb bob at the intersection of the strings to the depth shown on your Dig Spec. Drive a stake into each corner of the hopper beneath the plumb line and string a level line between stakes at the required depth to indicate the exact position and finish grade of the hopper.



← Once you have located the hopper pad, use stakes and strings in the same manner to mark the finish grade of the hopper walls, as shown on your Dig Spec.

In each corner of the shallow end, measure the required depth from the top of the panels to the pool bottom and place a marker. String a level line between markers to indicate the finish grade of the bottom. This will be outlined further in the next section.



← When the finish grade has been established, remove at least 2" of earth from below the strings. Tamp the entire area thoroughly and take away all stones, twigs and rocks. This will be outlined in the next section.

CHECKING THE FINAL GRADE

There should be a minimum of 1½" 'to 2" between the finish grade strings, and the dirt excavation. The walls, floors, and slope should all be flat and as smooth as possible to avoid excessive vermiculite use. Hand trim areas that are too high. Fill and pack low areas and voids with clean sand. Fully remove any tree roots or rocks. String across the slope diagonally from the deep end corner stakes up to the 2" pool floor line on the bottom of the pool wall panels. This will give you a more accurate view of the excavation. Starting from the shallow end wall, run an additional string down the center of the shallow end, over the break, and down the slope to the beginning of the deep end floor. This will help when spreading the concrete in the finishing process, particularly for larger pools.

TIP

Be sure to check strings during finishing of the pool bottom to see that they are tight, and not sagging.

POSSIBLE POOL BOTTOM MATERIALS OPTIONS

SAND - A fine grade, stone free, clay-bearing sand can be used as a base for the liner. To insure firmness, it must be tamped/packed down thoroughly and then troweled/spread evenly. Spray a fine mist of water over the sand to help compact it and make it easier to spread. Spray misting should be done periodically to keep the sand moist until the liner is installed. The disadvantage of a sand pool base is that it will show depressions and indentations from usage. A sand pool base is not recommended in areas of high-water tables.

STONE DUST - This material packs harder than sand but is troweled and worked similar to sand.

GROUT - Mixing sand and Portland cement provides a hard surface for the pool bottom, eliminating the depressions found in sand bottoms. It is an acceptable base for a liner in unstable ground conditions (clay or high-water table). Spray with a very fine mist until evenly damp. Be careful not to wash the cement away or premix one shovel of Portland cement to 5 to 8 shovels of sand. Use round pool trowels to apply.

VERMICULITE, SAND AND PORTLAND MIX- Using a paddle mixer, combine ½ of a 94 lbs. bag Portland cement, 1 bag vermiculite and 25 shovels of mason sand; mix well. Add a minimal amount of water to form a workable mix. Do not over mix after adding water; no more than 2-3 minutes of mixing post water.

VERMICULITE - If groundwater is encountered or the ground is extremely unstable/disturbed, a vermiculite cement mix is recommended. Follow the instructions for the particular brand you choose.

MIXING PROCEDURE FOR VERMICULITE/PORTLAND BASE

- A 5-cubic foot or 9 cubic foot paddle type (mortar) mixer is recommended.
- Add 10 gallons of water into mixer first (actual amount of water needed can vary). Use a 55-gallon drum if needed as reservoir and 5-gallon bucket to pour measured water into mixer.
- Next add 47 lbs. (½ - 94 lb. bag) of Portland type I or type III cement (With larger mixers it is possible to mix 20 gallons water with 1 - 94 lb. bag of Portland.) Mix well.
- Next add 1 bag vermiculite. (2 bags with 20 gallons mix) Do not over mix. Run mixer 20 to 60 seconds to avoid clumping.
- Transfer into a wheelbarrow or plastic buckets for transport to the pool.

MIXING PROCEDURE FOR PRE-MIX BASE

- A 5-cubic foot or 9 cubic foot paddle type (mortar) mixer is recommended.
- Add 5-6 gallons of water into the mixer first (actual amount needed can vary). Use a 55-gallon drum if needed as reservoir and 5-gallon bucket to pour measured water into mixer.
- Next add 1 bag of premix. Do not over mix. Run mixer until mixture is damp and workable.
- Transfer into a wheelbarrow or plastic buckets for transport to the pool.

BOTTOM FINISHING PROCEDURE

Pool bottom finishing can be done by progressing either from shallow to deep end or deep to shallow end. Finishing in the shallow end is much easier, however 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 the purpose, a wooden extension ladder with a 16' X 36' board nailed to the bottom should be set on deep end floor. This will enable the work crew to climb out of the pool without disturbing the finished bottom.

Mix can be conveyed from the mixer to pool bottom by 5-gallon buckets. An optional method is to transfer mixture from the mixer to a wheelbarrow. Then use a 2 X 10 ramp to pour mixture over the pool wall directly into the pool bottom however care must be used to minimize splatter. The crew can use a flat shovel for final placement.

TROWELING THE POOL BASE

TOOLS

Trowels

When troweling the sand or vermiculite pool base, a minimum of thickness of 1½" must be maintained throughout. Spread the vermiculite out with a flat shovel into roughly 2' X 6' sections. Use a 30" magnesium Darby or 16" pool trowel to spread and flatten the sand/vermiculite. Get the vermiculite as flat, even, and smooth as possible while spreading the material in several directions.

At the base of the hopper walls, bring the sand/vermiculite 2" up the pool wall to the set string. It is important to avoid sharp edges or pockets in the pool bottom, thus avoiding areas for dirt to collect after pool is filled. Make sure everything is spread until smooth and even.

As deep end slopes are completed and the hopper bottom is troweled, all strings and stakes should be removed from the bottom and vermiculite troweled smooth. Be careful to trowel out any crumbs as work progresses. These will show though the liner if they are not removed. If the bottom is troweled from deep to shallow it may be difficult to keep crumbs out of the finished bottom. Debris cannot be swept out until bottom is cured, and most vermiculite mixes are not ready to walk on for at least 24-48 hours, delaying liner installation.

If troweling shallow to deep, keep working crumbs and debris to a final corner of the hopper. Trowel the deep end walls first, the floor around drain, and work your way onto the ladder board. Leave the pool carefully to avoid crumbs and carefully lift out the ladder and board with 2 crew members.

Starting in the hopper end, bring the pool bottom up to finish grade with a damp-sand/cement mixture, or vermiculite/cement mixture. Trowel smooth.



INSTALLATION OF THE LINER

TOOLS

Commercial Vacuum, Screwdriver, Razor Blade, Duct Tape

After the sand/vermiculite bottom has been completed, the liner can be installed on a wet or dry pool floor. However, if weather and time permit, allow the pool floor to dry completely (24-48 hours).

TIP

The liner should be installed before rain has a chance to do any damage to the pool bottom.
If rain is unavoidable, cover the pool floor with plastic.

If the pool floor is completely dry, 2 -3 people will be needed to install the liner. Wipe down the pool walls with a rag to remove any dirt or vermiculite that may be stuck to the walls. Use a hand trowel to remove rough spots in the floor and a soft broom to remove crumbs or debris that may be in the pool bottom.

If the pool floor is not completely dry, you will need 4-6 people to install the liner to prevent dragging the liner across the bottom. Unroll the liner at either end of the pool. 2-3 people should hold the liner while 2-3 people work the liner toward the other end, being careful not to drag the liner on the pool floor.

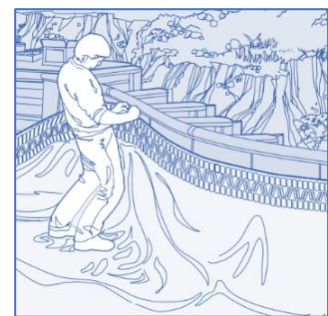
1. Upon opening the liner box, you will notice that the liner is marked with arrows (either on the liner box or the liner itself). Place the entire liner box in the shallow end near the break line and note which direction the liner box shows as the deep end and which is the shallow end. Keeping it rolled up, remove the liner from the box ensuring that it is facing the proper direction. After positioning the liner, remove the red arrows. Unfold the liner to both sides going towards the shallow end corners.



2. Continue to unfold the liner, carrying (not dragging) it to the break line of the shallow end and down the transition slope in order to rest the liner on the pool bottom in the deep end/hopper.
3. Back in the shallow end, line up the bottom corners of the liner accordingly. Position and adjust the liner until all points in the shallow end are aligned. To prevent the positioned liner from moving, secure the liner around the bottom of the entire shallow end with sand bags or water tubes.
4. Next, grasp the corners of the deep end portion of the liner and unfold as you did in the shallow end. In the same manner, position and align the deep end of the pool. Climate any wrinkles by pulling and positioning the liner accordingly.

IMPORTANT! Liners with vinyl overlay step(s) require fitting the step section(s) first, before any of the shallow end wall bead is put into place. Use sand bags or water tubes to secure the liner at the step(s) and snap liner beading into place.

5. Once the corners are aligned, insert the bead of the liner into the coping at the corners. Once all of the corners are set, proceed to the middle of your long and short walls and insert the bead into the coping here as well. Continue to work the material from these locations towards the corners in both directions. This will allow for a better, more flush fit in all of the corners.



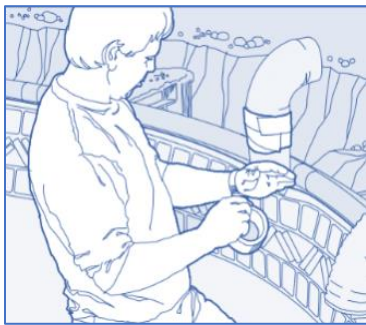
TIP

When pulling the liner, always grasp a heavy fold of material with both hands. A heavy gauge of vinyl can take a lot of pull without being damaged whereas a thin amount material can tear when being pulled. Be Careful not to drag the liner against coping, ladder sockets, or any potentially damaging surfaces.

VACUUMING THE LINER INTO PLACE

Remove/pull back about 6" of liner from the track/coping at the shallow end break point, or if you are installing a flat bottom pool liner do this near the center of the longest wall of the pool.

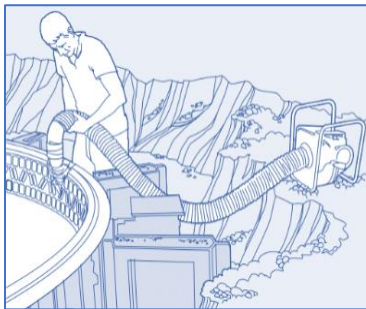
Insert the suction hose of a commercial vacuum between the vinyl liner and the wall about 4"-6" from the pool floor or approximately 20" from the top of the pool.



Create a seal around the hose to make the insertion point airtight. Use tape that will not damage the print on the liner and/or avoid putting any tape on the print. Seal all other openings into the pool, such as the skimmer cover, pipe ends, and step cover to prevent air leaks.

OPTIONAL

You could also use a vacuum hose through the skimmer opening and down between the liner and pool wall.



Turn the vacuum on and work out any wrinkles while adjusting the liner's position as needed to match the pool's bottom shape. Wrinkles can be removed by reaching over the wall and carefully pulling on the liner sidewall material. Use caution at all time when handling the liner as not to damage it.



*The above pool is a good example of what your liner should look like; wrinkle free.

IMPORTANT! If a pool step is installed, use 3-5 sandbags in front of the step to hold the liner in place (only on dry floor). Use duct tape to tape the liner to the steps to prevent vacuum loss around the step. Tape the back-side edge of the coping on the top of the pool panel if necessary to improve air seal for fitting the liner. Turn off the vacuum if repositioning of the liner is needed.

IF THE VINYL LINER DOES NOT FIT:

In the unlikely event that the vinyl liner does not fit:

DO NOT FILL THE POOL WITH WATER!

DO NOT CUT THE LINER!

DO NOT ATTACH ANY FITTINGS!

First, determine that the vacuum is effective. Reassess the liner's position in the pool. Be sure the liner ends are not reversed by making sure that the shallow end side is in the shallow end and not in the deep end, etc. This is a common mistake made by installers of every experience level. Look at the floor of the vinyl liner; in most instances there are fewer seams in the shallow end. If repositioning is necessary, shut off the vacuum and move the liner accordingly.

Check for unusual features of the pool that may have been omitted from the order such as a cove in the shallow end or a straight step cut on a corner step or radius section of the wall.

Compare the corners of the pool with those of the liner to be sure that they are the same arc, shape, and/or length.

If the liner is still not fitting properly:

Contact Royal Swimming Pool's Customer Support immediately!

ADDING WATER AND FINAL INSTALLATIONS

TOOLS

Commercial Vacuum, Garden Hose, Duct Tape, Screwdriver,

IMPORTANT! The pool should have 4"-6" of water in the shallow end BEFORE installing the faceplates for the step(s), swim-out, light, skimmer or returns. Skip to "Step Faceplates" for additional direction before your pool is completely filled. Read through the following section completely before continuing.

FILLING THE POOL WITH A GARDEN HOSE

Examine the liner from all directions. Before filling the pool, all folds or wrinkles must be pulled out ensuring that the liner is flat as any wrinkles still in the liner may remain permanently. It may be necessary to turn off the vacuum and reposition the liner several times. After properly positioning the liner correctly, use a garden hose to start filling the pool with water while the vacuum is still running. Examine the hose ends first to be sure that no sharp edges will damage the liner; tape the ends if necessary. Place the end of the hose on the bottom of the hopper. After 8"-12" of water has filled the deep end, turn off water source but not the shop-vac. Install the main drain gasket and the main drain faceplate underwater.

- Very carefully puncture the liner where the heads of the 2 previously installed screws protrude
- Back the screw out through the vinyl liner and quickly position gasket and faceplate
- Reinstall the 2 screws and partially tighten each
- Install the remaining screws through the faceplate and gasket, puncturing vinyl as each screw enters a pilot hole in main drain body
- Tighten screws evenly and securely in a cross-pattern sequence
- After completely installing the faceplates, trim the vinyl from inside the main drain faceplates with a sharp blade and install the main drain grates.

Continue to fill the pool with water, continuing to remove any wrinkles as necessary. If wrinkles remain, you'll have to pump the water out to remove them and then refill the pool. To avoid this costly and time-consuming error, remove any wrinkles before they are covered with more than 2" of water.

TIP

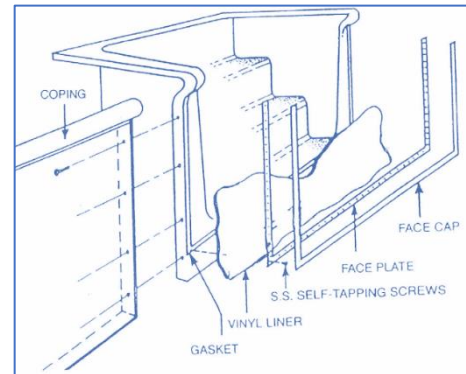
The vacuum must remain running until the water is covering the shallow end or else wrinkles will develop. When about 4" - 6" of water is up the shallow end wall, turn off vacuum and remove hoses from behind the liner. You will want to remove the vac hose before it is covered with water otherwise it becomes impossible to remove.

FILLING THE POOL WITH A FIRE HYDRANT OR TANKER TRUCK

Fill the hopper with 2' of water from a garden hose before the high-pressure source is turned 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 under the liner and disturb an otherwise smooth pool area. Flush the water line to remove any accumulated sediment that may be in the water hydrant lines.

STEP FACEPLATES

Install the step and swim-out faceplates being careful not to strip or break the screws. **DO NOT OVERTIGHTEN.** The gasket should be located between the step and the liner. For installation of step section faceplates please defer to the individual manufacturer's instructions. Carefully use a razor to cut out the liner material on the step side of the faceplate.



INSTALLATION OF LIGHT NICHE FACEPLATE

As the water reaches to approximately 2" below the bottom of the light niche opening proceed as follows to install light niche faceplate. Refer to the manufacturer's instructions first. Remove the previously installed faceplate screw by piercing the liner at the screw head and removing the screws. Align the faceplate right side up. Insert screws through the faceplate into the liner holes and partially tighten. Insert the remaining screws, piercing the liner and tightening each in a cross-pattern sequence. Check all screws for tightness one final time. Make sure conduit is installed water tight to a point at least 12" above the pool coping before continuing to fill the pool.

IMPORTANT!
Consult the current National Electrical Code Handbook for specific requirements on installation.

INSTALLATION OF THE RETURN INLET FITTING AND SKIMMER FACEPLATE

When water is approximately 6" below inlets, install the inlet fitting faceplates. Remove previously installed faceplate screws. Position the faceplate and re-install the screws. Partially tighten each screw. Insert the remaining two screws and tighten all screws in a cross pattern sequence. Cut the liner inside the faceplate. You will want to complete PVC plumbing before the pool water level reaches the return inlet.

IMPORTANT! *Do not fill the pool more than $\frac{3}{4}$ full unless the back filling is $\frac{3}{4}$ completed. The water pressure can over stress the pool walls.*

BACKFILLING THE POOL

TOOLS

String, Earthmoving Equipment

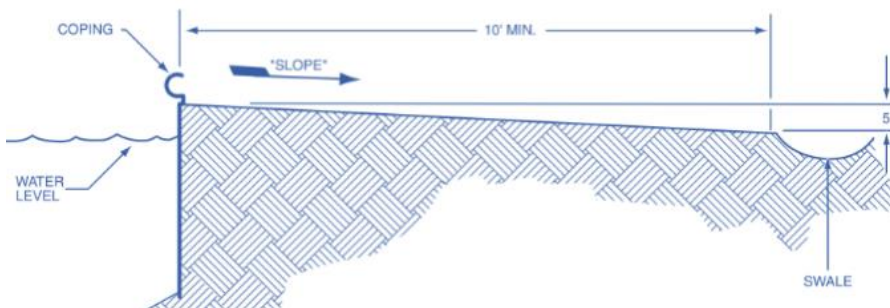
When backfilling the over-dig, it is useful to have a string set up along the coping of the long sides of the pool to help maintain straight walls. The water level in the pool should be at least $\frac{1}{2}$ way up the vertical walls to help offset the pressure of the backfill. Do not fill the pool any higher than 1"-2" below the bottom of the skimmer or you risk over stressing the pool walls.

IMPORTANT! All earthmoving equipment (such as a caterpillar, backhoe, front end loader or bobcat) must be kept a minimum of 3' away from the pool walls at all times to offset the risk of caving in pool walls.

TIP

It is possible for the pool walls to get pushed inward during backfilling. If this occurs, the pool walls will need to be dug out by hand all the way down to the footing. This will allow the pressure to push it back out.

During the backfill process, be careful to remove any large rocks, cinders, large roots, or other debris. Good backfill material can either be clean sand, river run, pea gravel, or small grade limestone. The plumbing should be supported or arranged flat in the trench to avoid excessive stress on the plumbing pipes. Backfill the overdig up to the top of the pool wall panel, not to the top of the coping. This allows for some settling and the correct thickness for the concrete decking. Once the pool is completely backfilled, fill the pool with water to the middle of the skimmer opening. Excessive water soaking around the pool to help "settle" the backfill should be avoided due to the possibility of water seeping under the footing and floating the liner. This can also wash fine grit behind the liner. The best method for compacting the backfill is to rent a high frequency power soil compactor (plate style compactor) available at most rental shops. This tool can be operated somewhat close to the pool walls and is by far the fastest, most effective way of reducing future settling problems



The final grading and contouring of the backfill should take in consideration the area and drainage of the pool deck and the drainage of the surrounding yard with the purpose of channeling the rain or snow runoff away from the pool.

FORM THE DECK

The deck is ready to be formed using 4" X 8' strips of ¼" Masonite for curved decks or regular 2 X 4's for straight decks. Be sure to keep the same distance around perimeter of pool for a neat job. Form deck at least 3'-4' wide around the pool and 6'- 8' around diving board and step areas. Screed backfill inside the forms to maintain constant depth of 3½ - 4" maximum, while maintaining elevation of the form. Staking needs to only hold the form in place about every 3'. Backfill dirt against the form for additional rigidity. The top of the form should be 1" below the top of the coping for a 4' wide deck thus giving a fall of ¼" per foot.

IMPORTANT! Be sure to mount safety rope anchors and coping clips before pouring the deck. Make sure the back side of rope anchors are exposed to allow concrete to bond to them.

SET ACCESSORIES

TOOLS

Drill

DIVING BOARD INSTALLATION

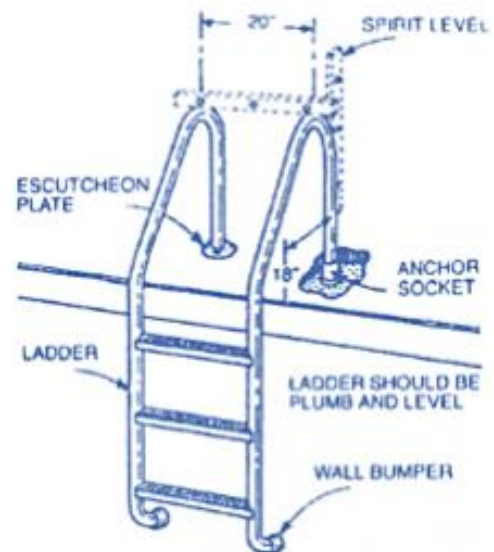
For specific requirements of jig placements, consult manufacturer's instructions. Be sure that the diving board jigs are in line with the centerline of the pool, level, and plumb. If concrete jigs are not properly set, the board installation will appear crooked and not function properly.

IMPORTANT! Do not mount or use the diving board for at least 5 days after concrete is poured.

LADDER PLACEMENT

Place the ladder over the pool wall in the middle of the deep end slope for easy access. If there are no steps in the shallow end, a second ladder must be placed in that section of the pool. Swimming pools with a walk out step are required to have at least one handrail at either side or in the middle of the step. Two handrails may be used at either side. A shallow end ladder is not necessary with a walk out step. Assemble the ladder according to manufacturer's instructions. Be sure to seat the rubber bumper pieces securely to the bottom of the rails to protect the liner from puncturing. Put the chrome escutcheon rings on each ladder rail. Insert rail ends into the anchor sockets and tighten the securing wedges, making sure rails are fully inserted and bottomed inside of the anchor sockets. Prepare step hand rails in the same manner for the escutcheon and anchor sockets. Electrical bonding set screws are located on the back of the anchor sockets. The ladder should be placed level, plumb, and parallel with the pool wall. Spray WD-40 on the rails before pouring the concrete to make cleaning easier. The anchor sockets should be completely encased in concrete and flush with the surface. Do not use the ladder for at least 5 days after the concrete is poured. Clean off any concrete splatters within 24 hours. Slide the escutcheons over the anchor sockets so they lay flat onto the concrete after it has been poured, and cured.

IMPORTANT! If there are no steps in the shallow end, a second ladder must be placed in that section of



ELECTRICAL BONDING

Any metallic hardware/accessories around the pool site and the pool walls must be grounded (bonded) to a common ground. For specific requirements on electrical bonding of swimming pools, the builder must consult the current National Electric Code Handbook or local electrical inspector's office.

The following instructions assume the reader is familiar with basic concrete finishing techniques. If you do not have previous experience with concrete flatwork it may be advisable to subcontract this part of the installation to a professional crew, due to the concrete deck is the finishing touch to the general appearance and quality of the pool installation.

IMPORTANT!

Wiring, spicing and grounding of the junction box and pool equipment should be done only by a licensed electrician.

Check all federal, state, and local codes for bonding requirements as your local inspector may be required for approval before the pool is backfilled and the deck installed.

PLANNING THE POUR

TOOLS

Concrete Tools, Masking Tape

Order concrete a day or two in advance from a local ready-mix company. Divide the total square footage of the deck by 75 to determine the number of yards of concrete needed (total square footage divide by 75 = yards). The amount of "75" is used for pools to allow for extra volume in coping, under wall, and around panel bracing. Order a 5½ to 6 lb. bag mixtures for the deck using limestone only and a 4 to 6 inch slump.

Do not pour the deck on a day when rain is forecast. (Covering concrete work during a rain is possible, but in the case of a swimming pool deck, it is made considerably more difficult with the ladder, step handrails, and diving board standards and limited access.) Have all the concrete tools on sight before starting. It is also advisable to have two concrete wheelbarrows on hand as well. You may not have enough access for a concrete delivery truck to reach the entire perimeter of the pool and hand wheeling may become necessary. Before concrete arrives, mask off the top edge of the coping to protect it from the concrete finishing process. Be careful not to let the tape lap over coping edge because the concrete will chip when the tape is pulled off.

Final Checklist Before Pouring Deck

- Recheck all forms for ¼" per foot fall
- All pool walls are straight
- Backfill has been screeded for constant 3½ - 4 inch depth
- Coping clips are in place
- Rope anchors are installed
- Diving board jig or standards are centered
- Electrical bonding is complete and inspected
- Plumbing has been pressure tested PVC or redwood expansion material on hand (optional)
- Skimmer extension collar is in place
- All concrete tools are on sight
- Coping is taped with duct tape or coated with dishwashing soap to protect from wet concrete (remove tape ASAP)

FINAL PLACEMENT AND FINISHING

Place concrete into forms and strike off the surface with a screed board. Be extremely careful to keep concrete from falling into the pool water. Concrete in the pool throws the pool chemistry off balance, makes cleanup much more difficult, can clog the plumbing and filter, and stain the vinyl liner. Screeding should leave concrete flush with the top surface of the coping. Also screed concrete flush with top edge of the skimmer opening. It is normal for the skimmer top to be recessed. Proceed with the usual steps for concrete finishing. Add redwood or PVC expansion materials and score the crack joints at 4 to 6 feet intervals around the perimeter. The final finish must be made with a concrete broom or sprayed with a hose to produce a non-skid surface as chlorinated pool water on slick troweled concrete creates an extremely slippery and dangerous surface.

DECORATIVE DECKS

Many different types of finishing can be used to produce beautiful and decorative deck designs such as an exposed aggregate, epoxy stone, Flo-Crete™, Sun Deck™, cool deck, or colored concrete. Crack joints can also be applied in a random pattern to create a natural flagstone effect.

FENCING AROUND POOL

All swimming pools are required to be fenced in to limit pool access. Check with local code requirements for swimming pool fencing. Also refer to NSPI suggestions in Appendix E.

INSTALLATION OF SAFETY ROPE

The current NSPI/ANSI Standard requires the installation of a safety rope with floats across the width of the pool parallel to and no less than one foot and no more than two feet from the point of the first slope change in water depths less than four feet six inches.

Slide floats onto the rope and attach a rope hook onto one rope eye. Attach the same way at other end of the safety line.

APPLICATION OF SAFETY WARNING LABELS

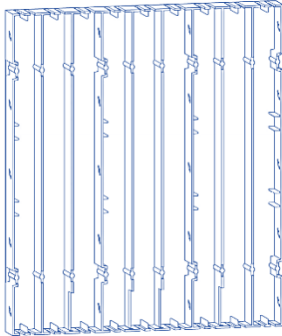
Refer to the American National Standards for Residential Inground Swimming pools ANSI/NSPI-5 2003 or latest version for detailed descriptions and illustrations regarding the use and location of warning signs to be permanently affixed within the pool area and clearly visible to all users!

One or two large area signs pertaining to diving or non-diving instructions as well as general pool safety rules are included in the liner box. These should be posted in a conspicuous location inside the swimming pool area.

Warning labels that state NO DIVING-NO JUMPING must be affixed to the pool coping. To be affixed properly, warning labels should be centered with one on each end of the pool as well as one on each side of the pool. It is the responsibility of the installer and/or the pool owner to affix these labels. Please note on your warranty registration form there is a space that must be checked stating that these labels have been affixed to the pool.

APPENDIX

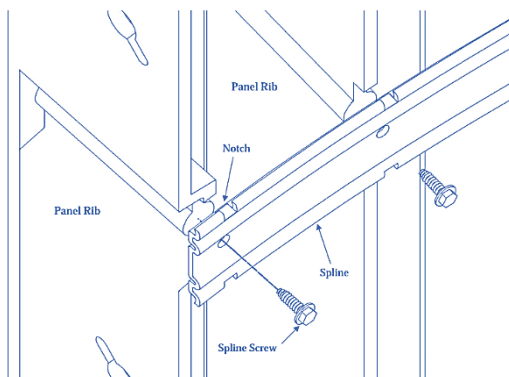
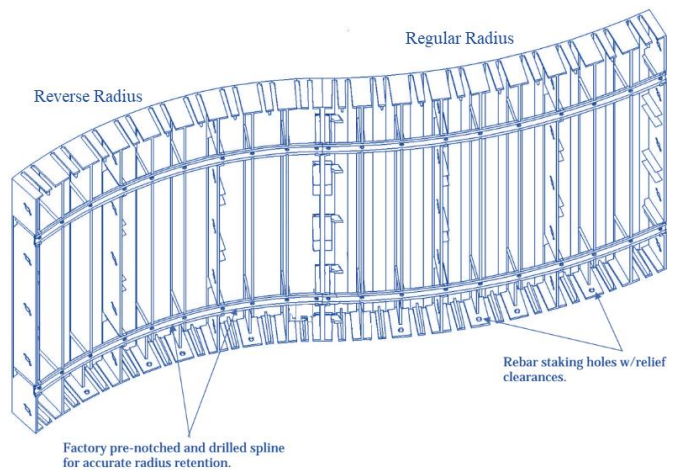
APPENDIX A: POLYMER PANELS



← For freeform pools using radius polymer panels flex design, panels will be shipped *flat* and arrive appearing straight as shown here.

Pre-notched splines will be shipped with your order. These are what give your wall panels their curved shapes.

Each panel will require two splines. Each spline piece will be the same length of its corresponding wall panel. For example, a 6' radius panel will require a 6' radius spline. Also, each spline will match its panels length of 1', 2', or 3'. →



← To attach the splines, lay the panel on a flat stable surface. Each spline will be predrilled and notched for the required radius. The spline should be installed with “This side up” toward the top of the panel. Attach spline to the rib of the panel one notch at a time until all holes are filled with screws. Repeat this step for the 2nd spline to complete required radius.

In some pool configurations, a 3 3/8" flex radius panel can be used to create a true 4' radius and/or reverse radius panel.

However, most 4' radius panels will come pre-molded. →



APPENDIX B: GROUND WATER

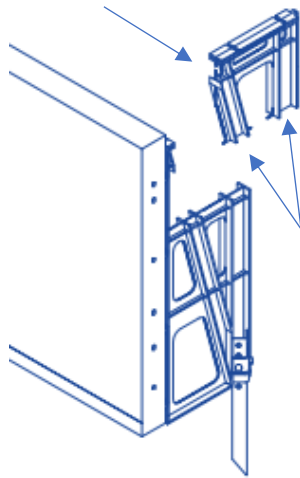
The following procedure will allow you to temporarily divert water that is encountered in the ground during draining the pool. Once the liner is installed and the pool is filled, ground water will not disturb the pool.

1. Begin by excavating a sump in the deep end. A 4'x 4' x 18" deep hole will usually be large enough. If water is seeping out of the walls of the hopper, cut channels into the bank to lead the seepage to the pump.
2. Carefully pack the sump pit and channels with 6"-10" of crushed stone. Do not disturb the surrounding earth. Placing stone too quickly can cause a mud condition which might plug up the stone and prevent proper drainage.
3. Once the stone is in place, cap the end of a 1 ½" pipe with screen, Drill ¼" holes in the pipe and place the pipe in the sump at least 6" below the *finished* height of the stone. The pipe line should extend from the bottom of the hopper to a convenient location level. Finish placing the crushed stone in the sump pit and channel until they are full (approximately 18"). Cover with plastic or burlap prior to finishing the pool bottom to keep dirt from clogging the stone. In some cases, you may need to use some type of wire to hold back the stone which you put into the channel.
NOTE: When replacing liners, check to see whether the previous installer has already installed a drainage system. If yes, continue with step 4.
4. Simply connect the sump line to a ¾ or 1HP, high head, self-priming pump and run the pump continuously, if necessary, throughout the remaining construction phases to keep the water level down and the hole dry until the pool is finished. Do not shut the pump off until the pool is complete and filled with at least 18" of water in the shallow end.

APPENDIX C: VINYL OVERLAY STEPS (VOS)

Vinyl liners designed for vinyl over step (VOS) applications require locating and fitting of the step(s) before any of the shallow end wall bead is put into place. The use of sand bags or water tubes is often necessary to hold VOS liners in position.

APPENDIX D: POLYMER BRACING MODIFICATION



Modification of polymer braces will be required when using automatic pool covers with an in-deck box (or recessed housing/box).

Modifications can possibly be required when installing a spill over spas as well depending on the finished height/location of the spa.

Cut off the top half of the Polymer K-brace as shown to provide adequate room needed for your housing. This removes the deck support function of the brace. To reinforce the deck, you can use Sono tubes (4-6" PVC) as shown in the example. →

