



To manufacture a liner, the installer must supply us with the following:

- ⇒ an accurate picture of the outside shape of the pool
- ⇒ precise measurements of the hopper bottom configuration.

In most pools, these two elements are relatively easy to obtain, but in others, a little more work is needed. It is our goal to make the more difficult measuring jobs a little easier.

You, the installer, are our eyes. We cannot see the pool. We cannot see if that kidney bends left or right. We cannot see if the gutter lines in the hopper are cut sharp or rounded. Therefore, we must rely on the information you provide. Missing or incomplete information slows everyone down.

Our intention is not to teach you how to measure a pool, but to show you what to measure.

We will concentrate on those pools which are often measured incorrectly. By doing this, we hope to inform and also speed up the ordering and design process, which will get your liners to you faster.

First, we will describe two different methods for measuring the outside shape of the pool. The first method we will work with is the “A-B Method of Measuring”. You would use this method when the pool is mostly curved, with few straight sections. The process is simple when broken down into steps, and this method is the most effective way to get a true, accurate picture of the outside shape of your pool.

The second method is the “Point-to-Point Method of Measuring”, which is used when the pool consists mainly of straight wall sections. This method is also very simple, particularly since no reference points outside the pool are necessary. All measurements are taken from one point within the pool to another point, also within the pool.

The next subject will be hopper bottoms. We will point out what to look for and what information we need. The more accurately we can model the hopper, the better the liner will fit.

Keep in mind, we will not be dealing with every possible situation you may encounter. There are many different ways to build a pool. You could have humps or dips in the slopes, rounded bottoms, slanted side walls...the list goes on. When you run into a situation that you are not sure of, don't guess. Give us a call first so we can discuss what information is necessary.

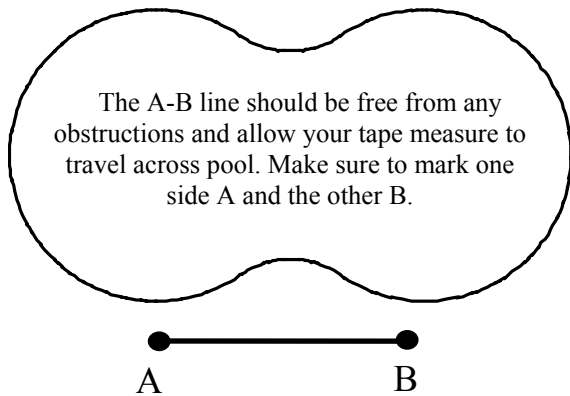
REMEMBER - outside shape and hopper bottom. Without these two elements, you cannot design a liner. No matter how powerful or fancy a computer system you have, no matter how many engineers you have working for you ...

No Shape = No Liner.

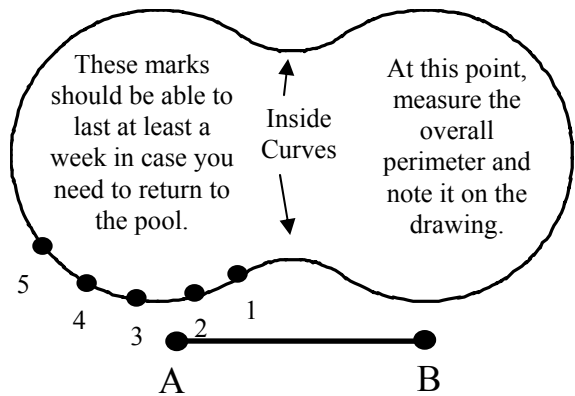
• **A - B Method Of Measuring**

Before you measure, get familiar with the type of pool you are going out to see. When it is a kidney, figure 8, or freeform shaped pool, you will use the A-B method. Prepare in advance everything you will need. Sketch the basic pool shape. Decide where you will stake-out your A-B line. Make a chart with enough space for all your A-B dimensions. The more you prepare, the easier the job will be. Remember to double check each dimension while you're at the job site. This will save you a lot of headaches later on.

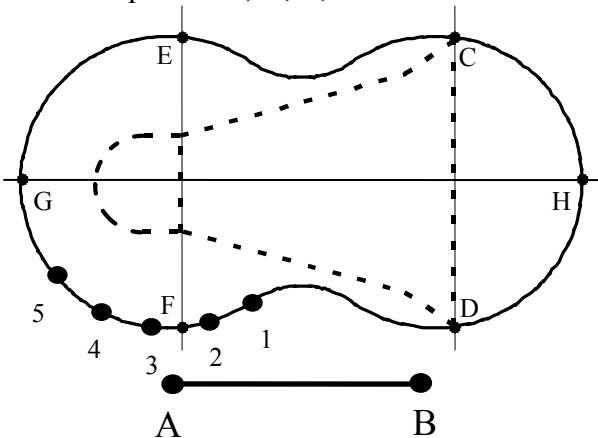
- 1) Locate your A-B line on the pool deck or level ground at least 5 feet from the edge of the pool and 15 to 20 feet apart. Show the location and length of the line on your drawing.



- 2) Mark the perimeter of the pool in 3 foot sections, except along the inside curves. In these areas, mark the pool in 1 foot sections.

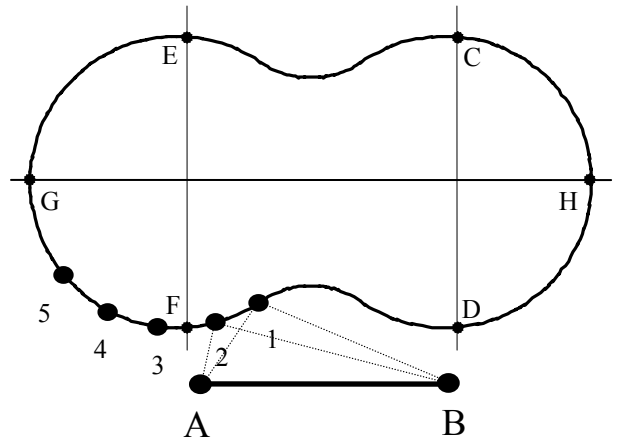


- 3) Next, find your deep & shallow end slope breaks. Pull a string line across the top of the pool. Line up the string with the break lines as shown. Mark these points: C, D, E, F.



Overall length of the pool is found by marking the centers of both the deep and shallow ends. Mark these points G and H.

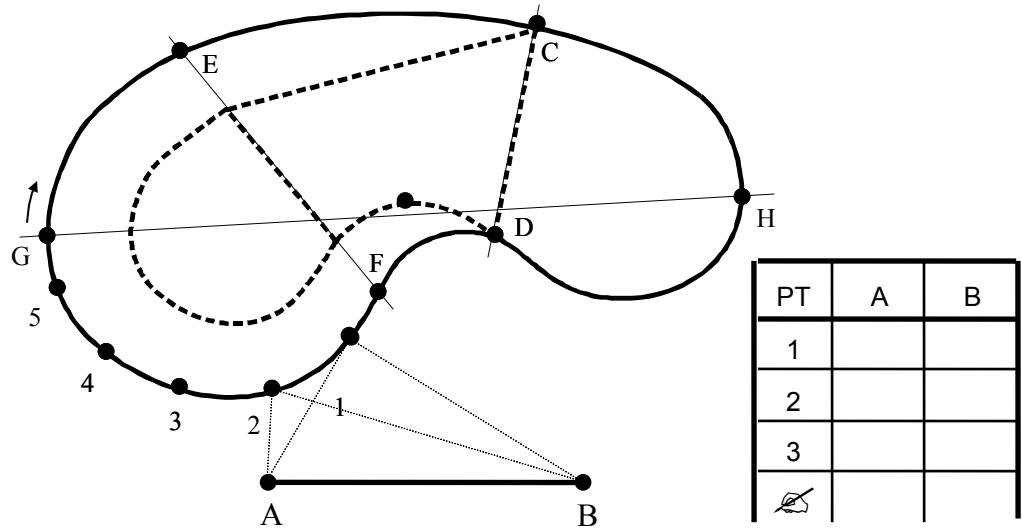
- 4) Now you are ready to measure. You must measure from A to every point, then from B to every point. Don't forget your C, D, E, F, G & H points.



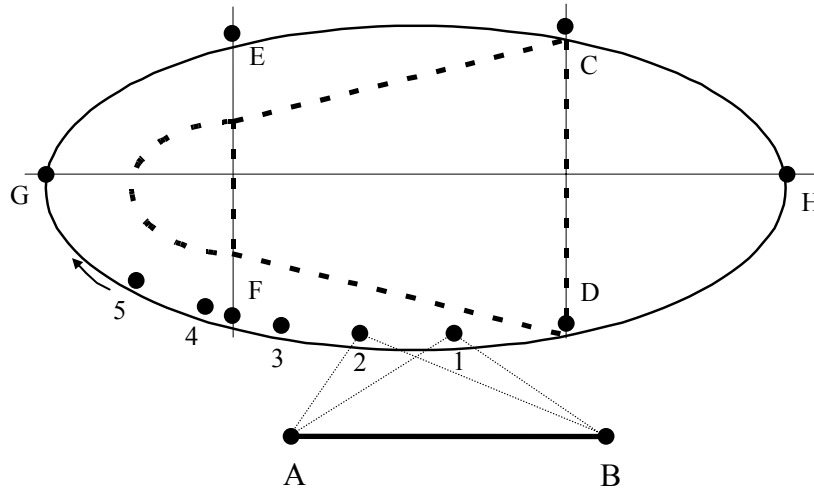
What you are doing is making a triangle to every point on the perimeter of the pool. This defines the outside shape and sets the deep and shallow end break line locations. Record all dimensions on your chart.

For kidneys, Figure 8's, Freeforms, and some ovals, the A-B system is the best bet. It's easy, it works, and it gets us the dimensions we need. Above all else, take your time, record all the information accurately and legibly, and you can avoid call-backs.

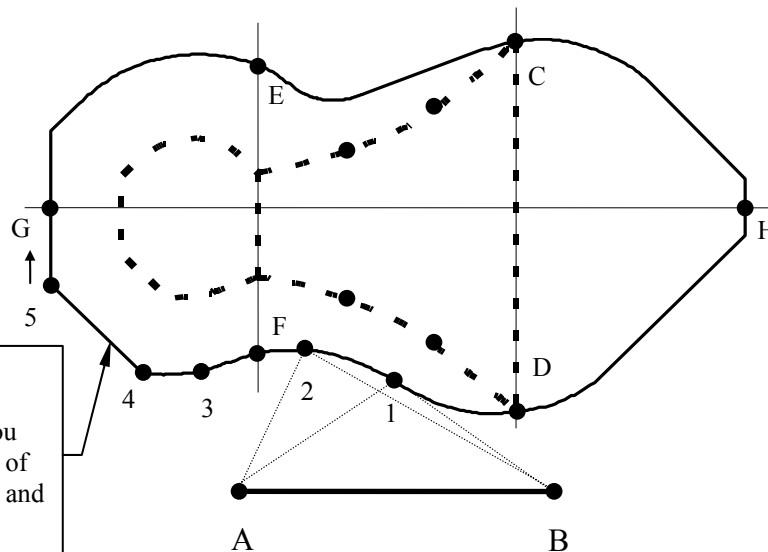
KIDNEY



ELLIPSE



FREE-FORM

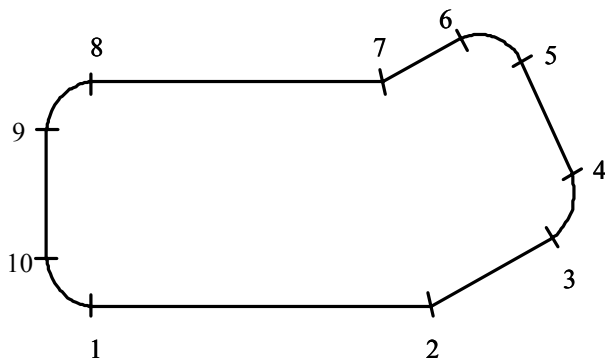


Note:
If the pool has any straight sections, you must mark the ends of the straight section, and tell us the length.

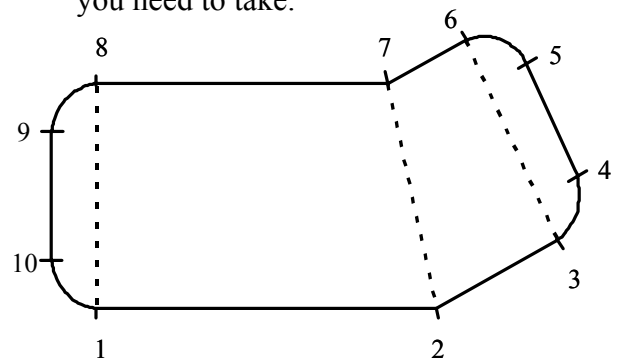
- **Point-to-Point Method Of Measuring**

The A-B Method of measuring can be used to measure every kind of pool, and will accurately define the shape of that pool. However, for pools which are made up of mostly straight sections, the Point-to-Point Method provides an equally accurate description of the shape with less measurements to take. With this method, no points outside the pool are required. Every measurement is taken from “point-to-point” within the pool and recorded on your chart.

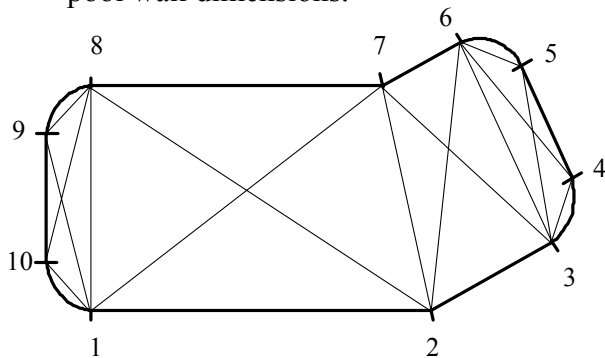
- 1) Locate and mark the ends of every straight wall section. It is important to number the points to identify the measurements you take.



- 2) Divide the pool up into sections. Measurements will be taken within each section. This is done to limit the number and length of the measurements you need to take.

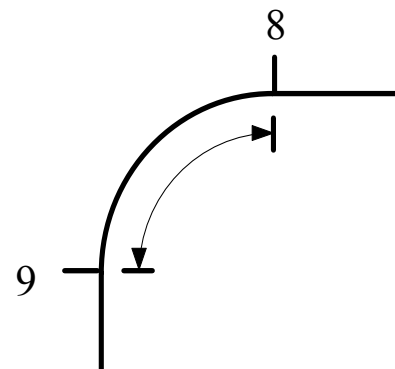


- 3) Now divide each section as shown below. Notice the series of X shapes in each section. These lines indicate the dimensions you will be providing to us. Do not forget to measure the outside pool wall dimensions.



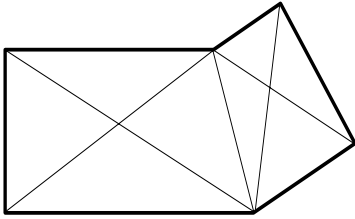
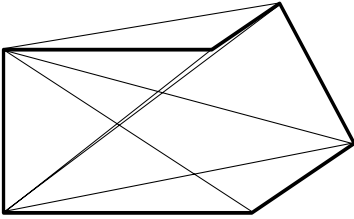
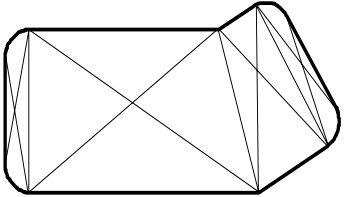
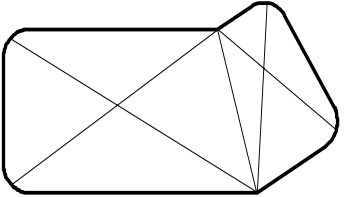
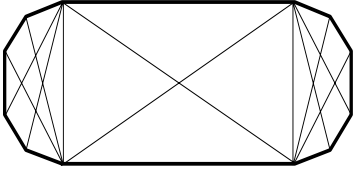
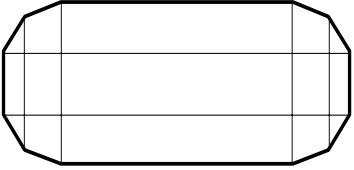
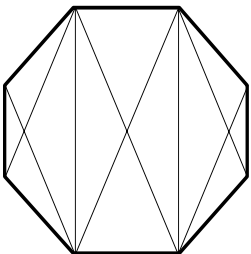
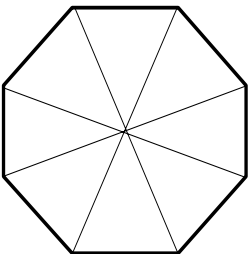
On your chart, note the measurements you take by indicating the numbers at each end of each measurement: for example, 1-2, 1-8, 2-8, etc.

- 4) If there are any radiused sections, measure the length of the curved wall sections and note them on your drawing.



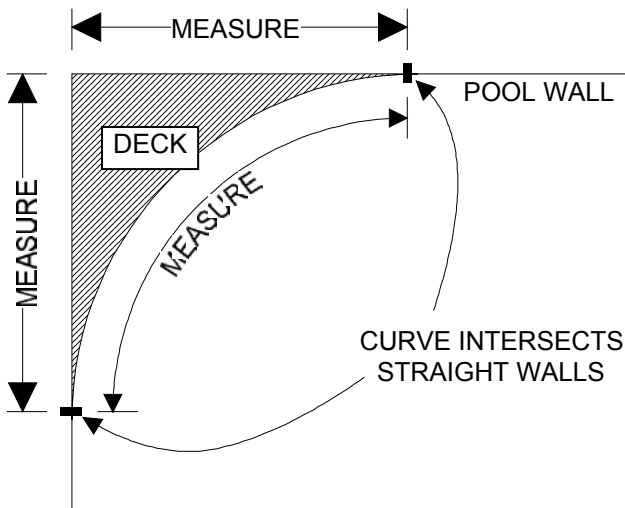
This measurement is taken by laying the tape measure along the inside of the radiused section of the pool wall.

The drawings below indicate which measurements are obtained using the Point-to-Point Method on a few common pool types. On the right are some measuring methods which have been supplied to us. None of these methods allow us to accurately and completely design the outside shape of the pool. They all result in delays and callbacks, requiring the installer to revisit the job site to obtain additional information as indicated next to each drawing.

	WHAT WE NEED	WHAT WE HAVE RECEIVED	
<p><u>Normal Lazy-L</u> Measurements are the shortest possible to define the pool, and none pass over the outside of the pool. Entire pool is broken into triangles.</p>			<p>Some measurements are overly long and pass outside the pool which may result in inaccurate dimensions. Also, the bend-to-bend dimension is missing.</p>
<p><u>Lazy-L with Large Radius Corners</u> Same as normal Lazy-L, except this sets the endpoints of the radius corners.</p>			<p>Diagonals measured from the center of the radius corner. This point cannot be determined until the design is complete.</p>
<p><u>Straight Panel Ovals</u> Accurately places the endpoints of all panels using triangulation. There is no variance using this method.</p>			<p>Widths taken across both ends of the pool provide no way to define the shape. Each section can be shaped in many different ways, and there is no way to connect the sections.</p>
<p><u>Octagons</u> Same as the oval above. Grecians can be measured the same way.</p>			<p>Similar to the oval above, there is no way to definitely connect the different sections of the pool.</p>

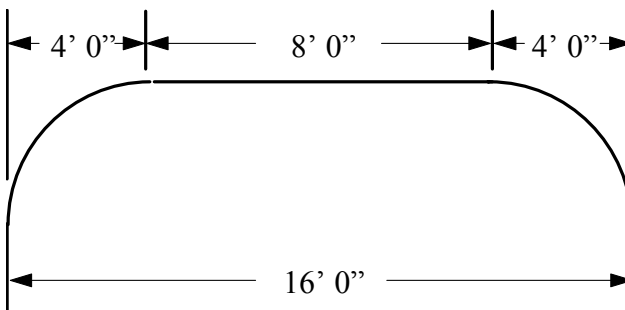
Using the A-B or Point-to-Point methods, where appropriate, will give us every possible outside shape. Although many pools are installed true to the manufacturer's plans, this cannot always be confirmed just by looking at the pool. If you are not sure or have any doubts, measure the complete pool. With accurate information, we can make your liner fit properly the first time.

LARGE RADIUS CORNERS



Finding the Theoretical 90° Corner

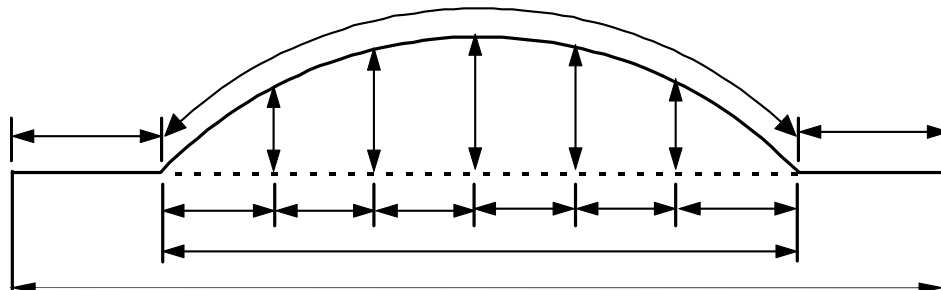
The pool is square, but you do not know the radius of the corner. First find the two points where the curve intersects the straight walls. Mark them. Next, use a string or chalk line and continue your side wall past the end of the pool. Do the same for the end wall, continuing past the side wall. Where these two points meet is the theoretical 90° corner. Check to make sure that the corner is square. Now, measure from you 90° corner location to where the curve intersects the straight walls. This will be your radius. Both measurements should be the same. Also measure the length of the curve between the two wall points.



When measuring a pool with radius corners, make sure that your dimensions for the outside of the pool make sense. For example, the pool on the left is 16' 0" wide. The corner radius is 4' 0" and the length of the straight wall is 8' 0". Since $4' + 8' + 4'$ add up to 16', these dimensions make sense.

ROMAN ENDS

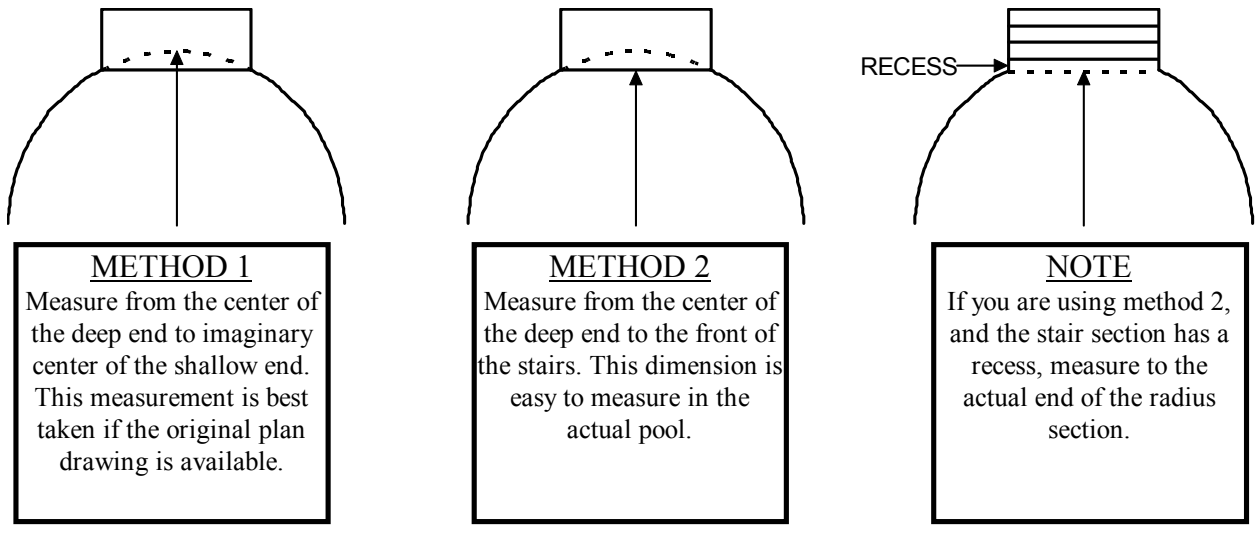
For both deep end and shallow end roman ends, divide the curve into six equal lengths. Stretch a string line from one side of the roman end to the other. Provide the measurements from the string line into the roman end wall. Use the drawing below to guide you on how to divide the roman end, and what measurements are needed. Also, measure the length of the curve by laying the tape along the wall and include this dimension on your drawing.



OVALS WITH STAIRS

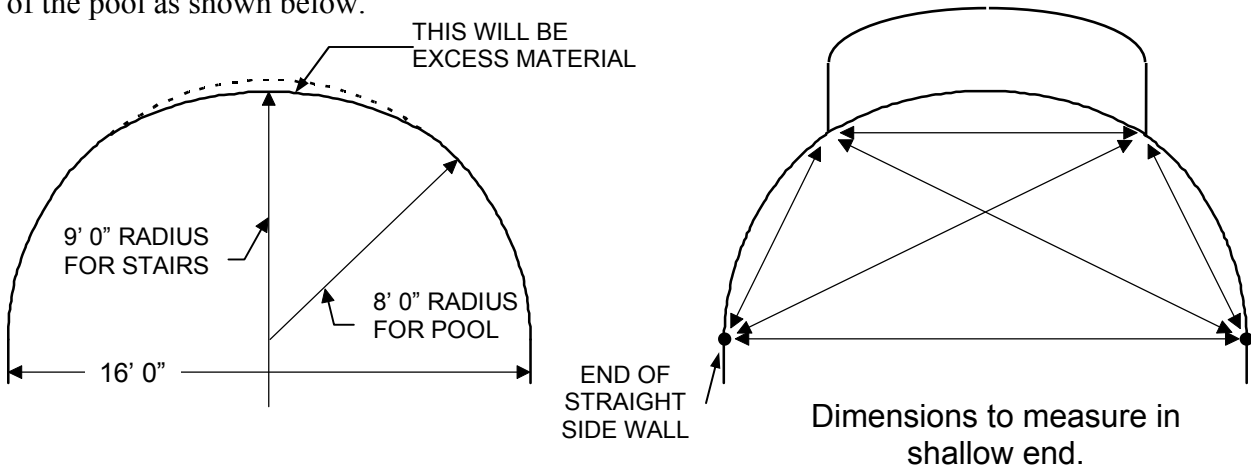
The overall length of an oval pool is important. Finding this is very simple on pools with no steps. However, when straight stairs are added to the end, the overall length of the pool becomes shorter, and it is then necessary for you to provide the actual length.

You can either give us the overall length of the pool as if no stairs were there or measure the actual length to the steps (see below). Don't forget to supply the straight sidewall length measurement, a very necessary dimension, and any other important dimensions indicated on the back of our order form.

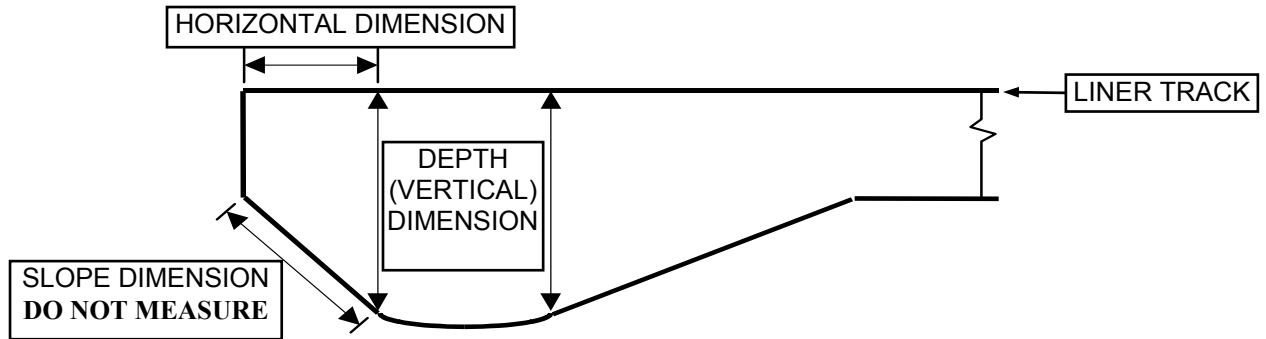


OVALS WITH RADIUSSED FIBERGLASS STAIRS

Radiused fiberglass stairs present a special concern for pools with oval ends. The radius of the stairs usually does not match the radius of the pool. On pools where the shallow end radius is less than the stair radius, the shallow end of the pool is flattened, reducing the overall length of the pool (see below). If you order the liner as a pool with no steps, you may have excess material running up the wall on the shallow end. When you have this situation, measure the shallow end of the pool as shown below.



When measuring for pool hopper bottoms, all dimensions entered must be horizontal and vertical. Do not measure the slope lengths (see drawing). Use the points you established when measuring the outside of the pool for reference with all your hopper measurements. When measuring the depth of the pool, do not use the depth at the main drain. Many pools are dished toward the drain and will result in a liner being too big. Take all your depth measurements along the edge of the hopper pad. If there is a significant depth change from the edge of the hopper pad to the middle, please indicate the middle depth on your drawing.



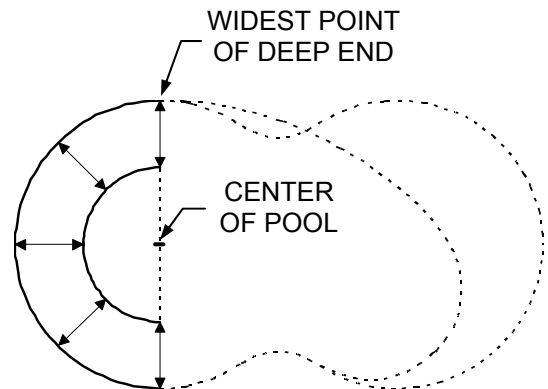
- Measuring Hopper Bottoms for :
- Figure 8
 - Kidney
 - Round Freeform

To make the job a little easier, break your pool up into three sections: the deep end, the slope to the shallow end, and the shallow end itself. Measure each section separately, noting your measurements on your drawing.

Usually the deep end will have two separate sections, the point where the deep end is widest, and the deep end break line. Keep in mind that there are exceptions.

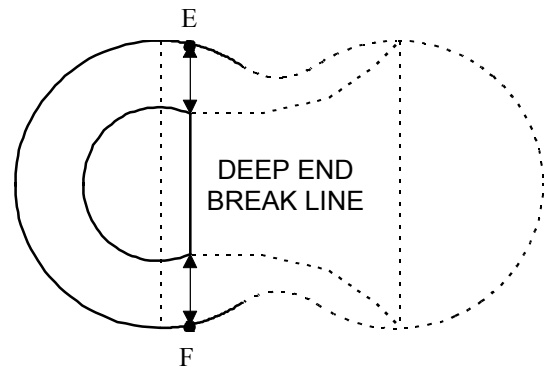
Widest Point of the Deep End

From the widest point of the deep end, break up the hopper into at least four sections as shown. Wherever possible, refer back to the numbers from your outside shape. From these points, measure toward the center of the pool. Record these horizontal dimensions. Also measure the hopper depth at each point.



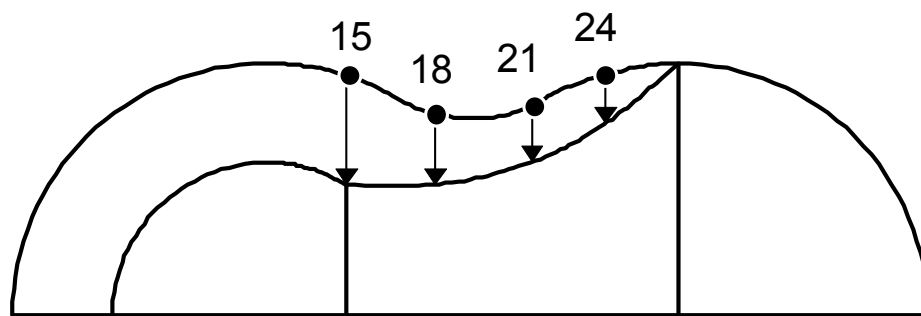
Deep End Break Line

Measure from the ends of the deep end break line to the wall as shown. If this were an A-B type pool, this would be the E to F line, and the measurements would be from points E and F to the ends of the deep end break line. Measure the hopper depth at each end of the deep end break.

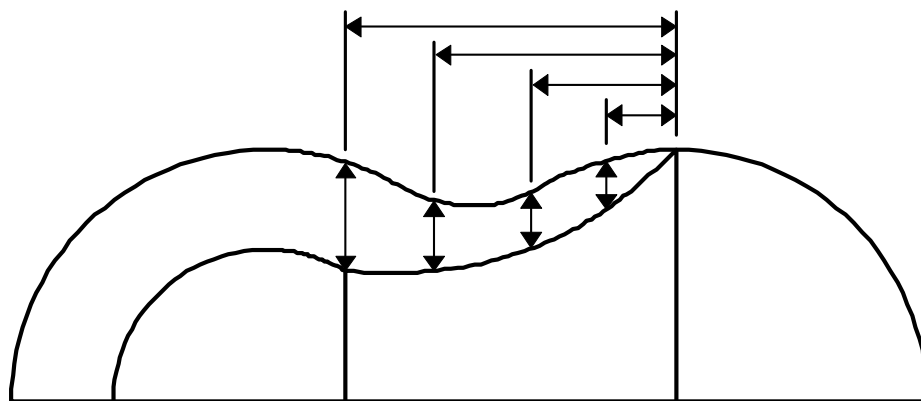


You have established the outside shape, the C-D and E-F lines are set, and the deep end is defined. The next section of the pool to measure is the ramp, or long slope. We are specifically interested in the slope contours, not only what it looks like, but what exactly the measurements are.

If both the deep end and shallow end break lines are parallel to each other, then you can define the contour with measurements taken straight out from the side wall as in the examples. When measuring like this, we must have fixed points to measure from: either the numbered marks you established when measuring your outside shape (example 1), or points set by providing a horizontal distance from the shallow end break to your point (example 2).

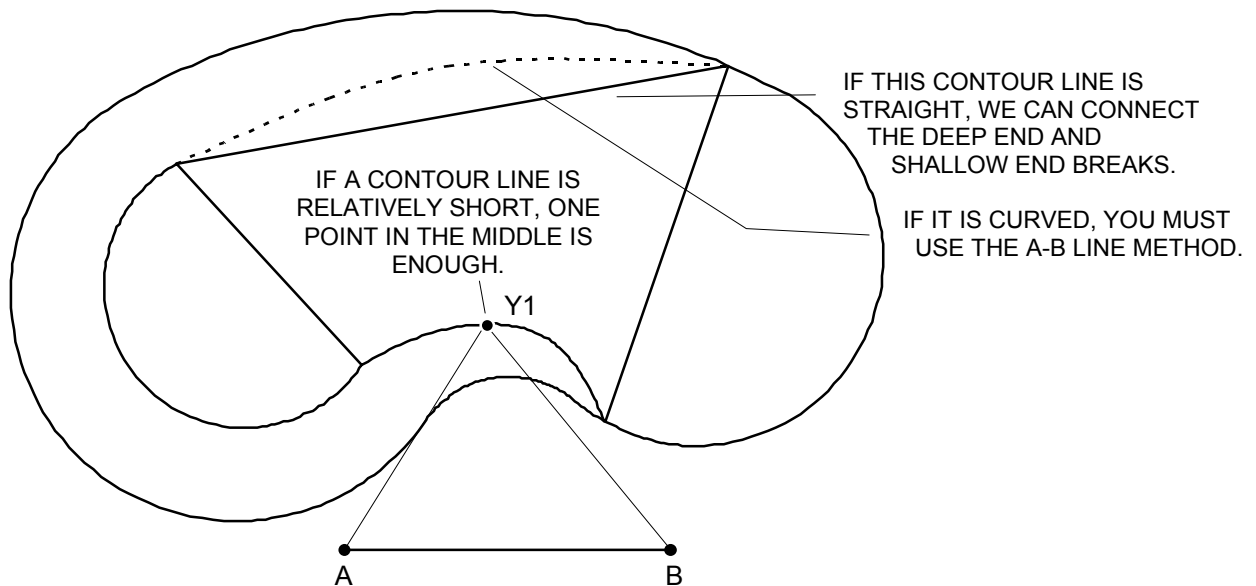


Example 1



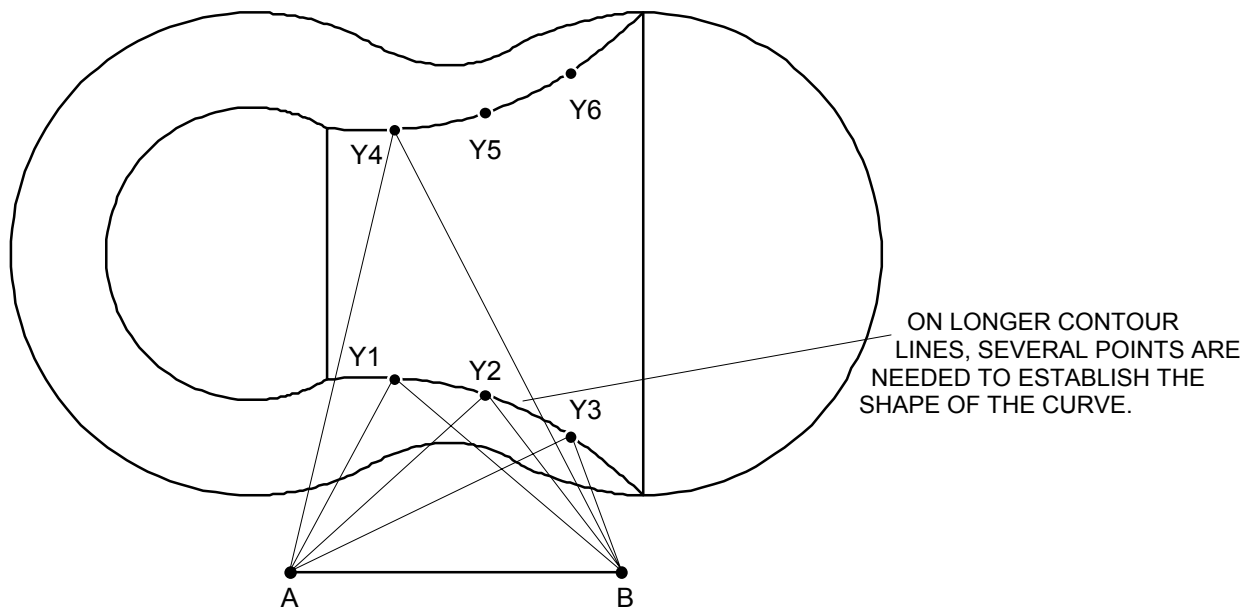
Example 2

Deep and shallow end breaks are not always parallel. This causes problems because there is no set direction to use for the measurement. You could measure parallel to the shallow end break, parallel to the deep end break, or anywhere in between, each of which will give a different measurement. To eliminate this problem, pick points on the contour line, and measure to them from your A-B line (example 3).



Example 3

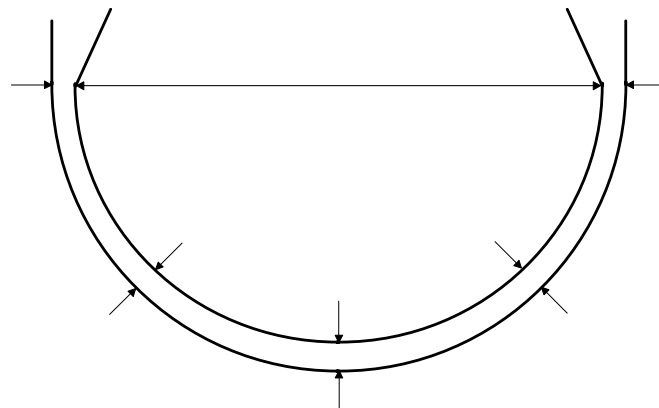
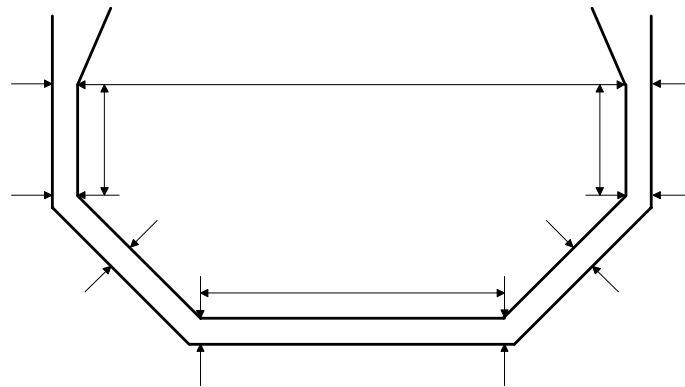
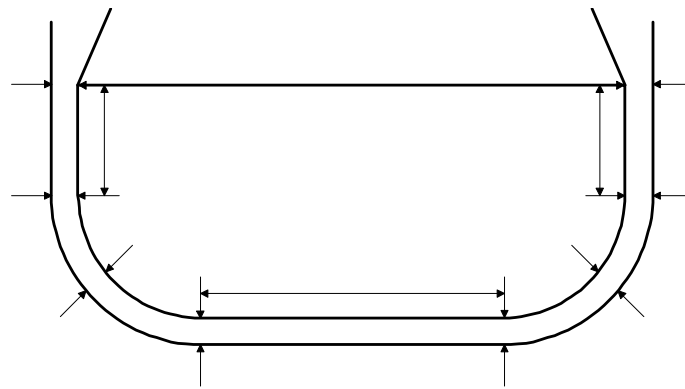
Even if the shallow end and deep end break lines are parallel, you can use this method to define the contour lines (example 4).



Example 4

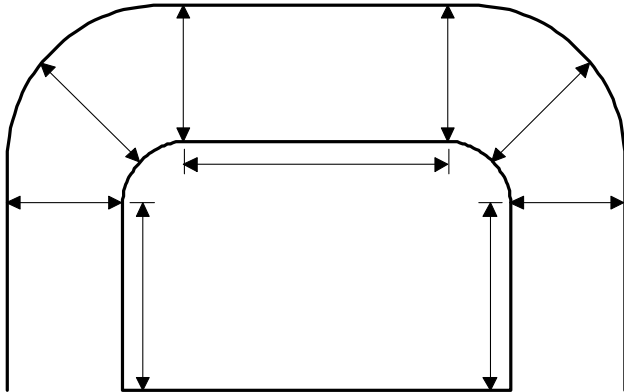
The last section of the pool to measure is the shallow end. For the most part, the shallow end shape is defined by the outside shape of the pool and the shallow end break line. However, you should look for any irregularities. For example: Does the shallow end slope down from the wall to the break line? Does the wall height vary around the perimeter of the shallow end? Was the shallow end dished so that it is deeper in the middle than at the side wall? Is there a cove around the shallow end wall? Are there steps, and where are they located?

A prime example of a shallow end irregularity is illustrated below. This may be simply described as a shallow end cove or, if the cove is large enough, either a modified flat shallow end or a tri-level pool. Whenever you encounter this type of pool, look at the shallow end as if it were a deep end, and provide the same measurements (see examples below) as you would for a deep end hopper bottom.

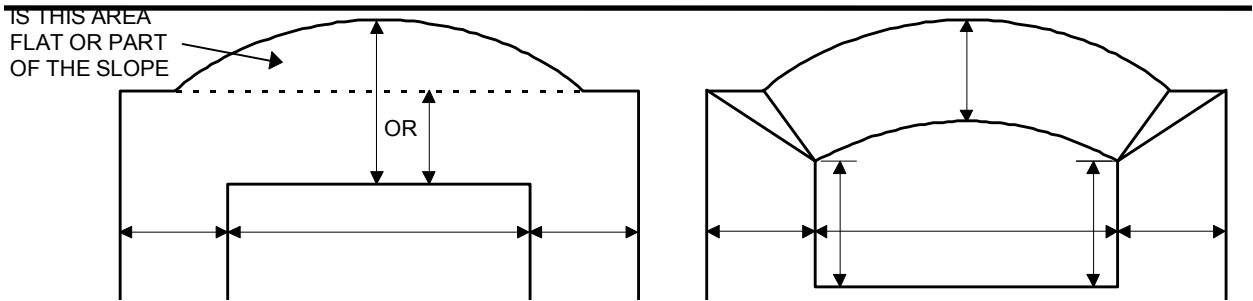


LARGE RADIUS CORNERS w/RADIUSED HOPPER

ROMAN ENDS



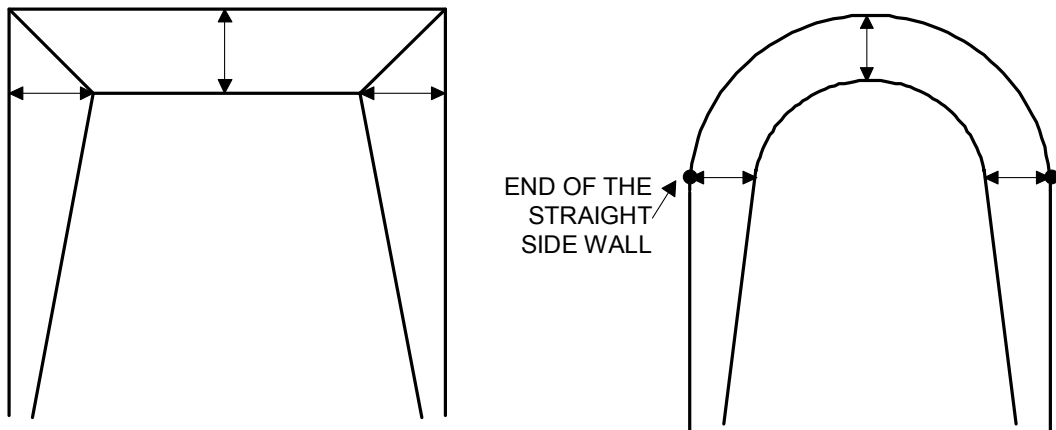
It is especially important that we are able to define the shape of the hopper bottom around the radiused corner. If we do not receive the necessary information, you will either get a liner that has too much material in the pad accompanied by wrinkles and puckers, or a liner which is too tight which could shorten its life.



Is the hopper pad rectangular shaped or does the front of it follow the shape of the roman end?

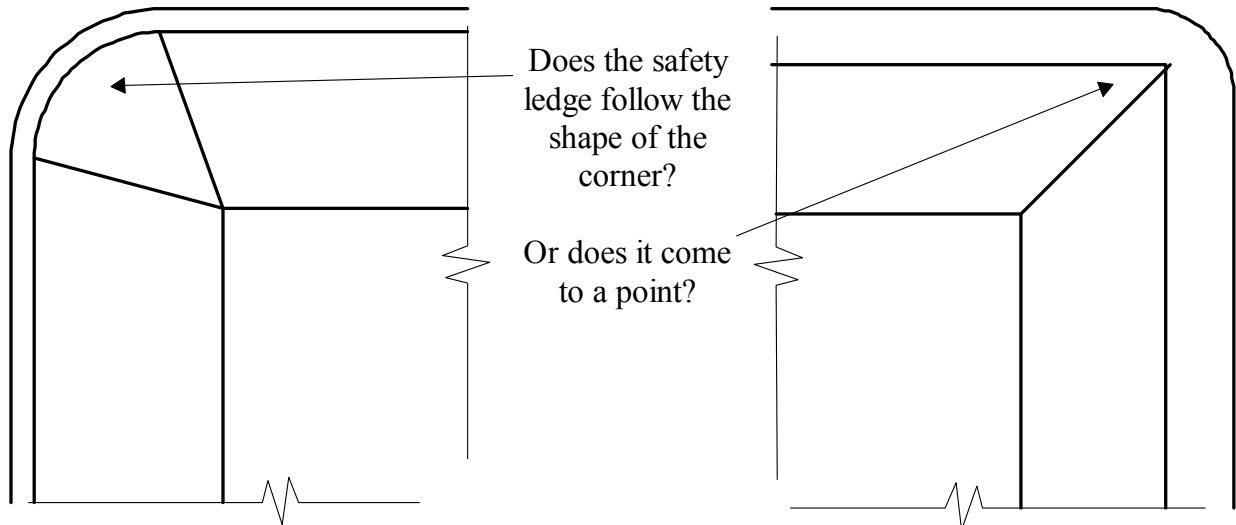
WEDGE BOTTOMS

These are the dimensions which are commonly omitted. Note the location of the side slope measurements for the ovals.

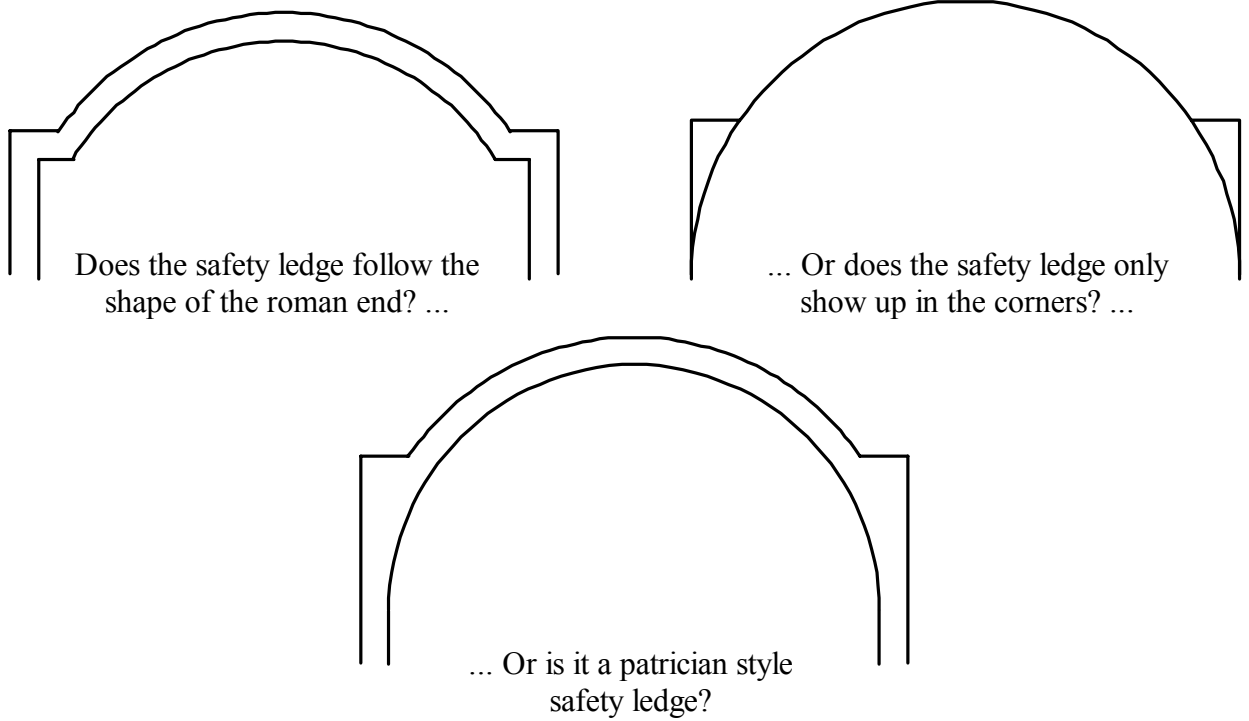


SAFETY LEDGES

⇒ Radius Corners w/Safety Ledge

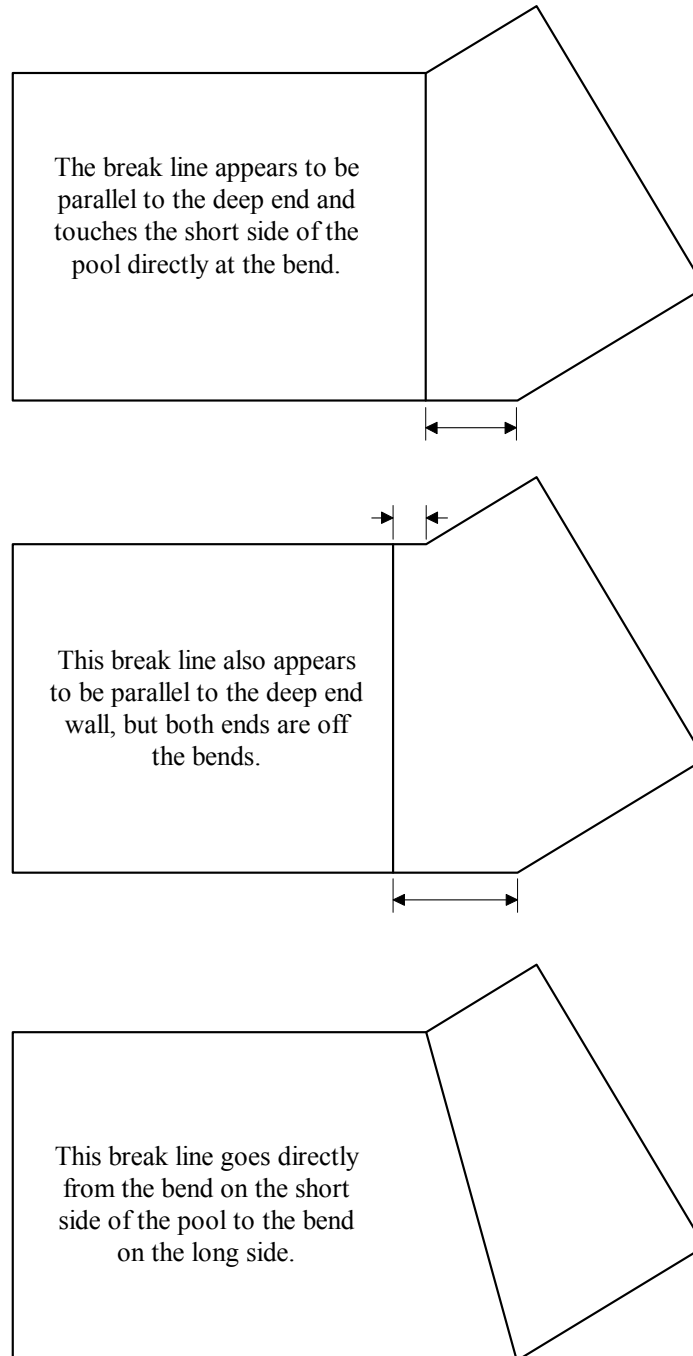


⇒ Roman Ends w/Safety Ledge



Remember to indicate the width of the safety ledge in several places.

LAZY-L'S - SHALLOW END BREAK LINES



Measuring is the key. If everything is measured properly, your liner will fit the first time. Over-stretching a liner is not the answer to a good fit, and may contribute to a premature failure. So we ask that when providing measurements, do not adjust or shorten dimensions.

Once again we would like to emphasize that not every situation has been shown on these pages. If you have a problem area you would like to discuss, or any comments or suggestions on what has been covered, please call Garrett Liners at 1-800-222-3650.

When measuring any part of a pool, either outside shape or bottom configuration, do not guess at the dimensions. You could get in a lot of trouble this way. For example:

You are measuring an A-B kidney. The last part of the pool you are measuring is the curved slope contour line. It's late in the day and you are tired, so you estimate the distance out from the wall to the middle of the curve is 3' 6". It actually measures 4' 0". When the liner arrives, you realize that there seems to be too much material in the section of the pool right near the center of the curved contour line. The result is wrinkles. Of course, the customer will not accept the liner in this condition, and you are forced to start over again.

Note that if you happen to estimate the other way, that is, you estimate a 4' 0" distance when it is really 3' 6", this section of the pool will be tight, causing unnecessary stretch to the vinyl.

Do not adjust any of your measurements for stretch. Garrett already factors in adjustments to allow for the proper amount of stretch. If you reduce your dimensions, and then we apply our stretch factors, you will double the amount the liner has to stretch. Remember, overstretch is not good for the fit or longevity of the liner. Excess material will not necessarily shorten the life of the liner, but the wrinkles that result look terrible. We at Garrett try to tailor the liner to fit the pool, and with your help, we can do the job.