

# Block and Liner Pool Kits

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## **Please read through all of these instructions before commencing the installation of your Swimmer Block and Liner Pool.**

Congratulations on choosing a Swimmer block and liner pool. The pool is so easy to install you can carry out the work yourself or, if you prefer, use a professional pool company.

The Swimmer hopper pool has many advantages over other pools:

- The pool wall is only 1070mm high around the entire pool perimeter, this economises on the blocks and materials used. It also minimises the stresses which are multiplied as the depth of the pool wall increases.
- The volume of soil to be removed from the excavation is small as the full depth of the pool is only in the hopper. When completed the reduced volume of water saves on heating and water treatment costs.
- The building time of the walls is speeded up and, if a local bricklayer is employed to build them, they should be completed in two or three days depending on the pool size.

- The pool should ideally be sited on level ground and positioned as near as possible to the house, for convenient changing and toilet facilities. Keep the pool away from trees and, if possible, sheltered from the prevailing wind. If there is a high water table contact your pool supplier for further advice.
- The filter, pump and heater are best positioned on the same level as the pool surround and should be as close to the pool as possible. It may be possible to house the equipment in a garage or summerhouse. Alternatively a simple building can be constructed.
- Mains services are usually located in the front garden. However before commencing to dig carry out a thorough check of the proposed site to ensure they are not located in the area.

Above all else consider safety. A safe pool is one which can be secured against unsupervised entry by children and animals. The erection of a suitable wall or fence will achieve this. It will also help to shelter the pool, thereby reducing running costs by lowering any heat loss and debris blowing into the pool.

- Establish the availability of an electricity supply and, if required, gas or oil.
- Establish the location of the mains water supply. A hose to the nearest tap is sufficient, although we recommend the inclusion of an automatic water-level unit, which will require a permanent connection to a water supply.
- Identify the location of the nearest drain or soakaway, to take the water discharged when backwashing the filter or emptying the pool.
- Consider the possibility of using the house central heating boiler for heating the pool via a heat exchanger. Your supplier can advise you on the suitability of this option. Alternatively a gas/oil/electric heater or heat pump can be used which must be positioned adjacent to the filter. Solar heating is also an option, the absorber panels can be mounted on a pitched or flat roof or directly onto the ground. Whether you intend to heat your pool or not an insulation or solar cover is recommended to reduce the overall heat loss and save up to 60% on heating costs. These covers are easy to use especially when installed with one of our storage rollers.

The annual running cost of a private swimming pool using modern filtration equipment is very reasonable, to obtain information on accurate costs contact your supplier.

The majority of authorities do not require you to obtain planning permission to build a private outdoor swimming pool, if in doubt consult your Planning Officer.

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The range of standard Swimmer block and liner pools starts at 4 x 8m constant depth and ranges up to a 6 x 12m hopper pool. Please note:

- A mortar bed of 18mm has been included between courses in block quantity calculation.
- Twenty concrete blocks have been added to actual total required to allow for cuts, etc.
- The different mixes required when laying the floor screed and applying the wall render.
- The reinforcement bar should overlap by a minimum of 400mm at joints.

**Note:** Site variations may affect the quantities below, which are given for guidance only and should be confirmed once the excavation is completed.

## Flat Bottom Pools

Pool Size:	4 x 8m
Concrete Blocks (440 x 215 x 100mm):	620
Ready Mixed Concrete (C-35 mix) - Foundation:	1.60m <sup>3</sup>
Ready Mixed Concrete (C-35 mix) - Ringbeam:	0.60m <sup>3</sup>
Ready Mixed Concrete (C-35 mix) - Total:	2.20m <sup>3</sup>
Reinforcing Bar (12mm):	105m
Rendering/Floor Screed - BS1200 Sand:	5m <sup>3</sup>
Rendering/Floor Screed - Cement 50kg Bag:	20
Backfill ¾" Clean Chippings:	6 tonnes

Pool Size:	5 x 10m
Concrete Blocks (440 x 215 x 100mm):	770
Ready Mixed Concrete (C-35 mix) - Foundation:	2.00m <sup>3</sup>
Ready Mixed Concrete (C-35 mix) - Ringbeam:	0.70m <sup>3</sup>
Ready Mixed Concrete (C-35 mix) - Total:	2.70m <sup>3</sup>
Reinforcing Bar (12mm):	105m
Rendering/Floor Screed - BS1200 Sand:	8m <sup>3</sup>
Rendering/Floor Screed - Cement 50kg Bag:	28
Backfill ¾" Clean Chippings:	7 tonnes

## Hopper Pools

Pool Size:	3 x 6m
Concrete Blocks (440 x 215 x 100mm):	400
Ready Mixed Concrete (C-35 mix) - Foundation:	1.20m <sup>3</sup>
Ready Mixed Concrete (C-35 mix) - Ringbeam:	0.40m <sup>3</sup>
Ready Mixed Concrete (C-35 mix) - Total:	1.60m <sup>3</sup>
Reinforcing Bar (12mm):	105m
Rendering/Floor Screed - BS1200 Sand:	4m <sup>3</sup>
Rendering/Floor Screed - Cement 50kg Bag:	18
Backfill ¾" Clean Chippings:	5 tonnes

Pool Size:	4 x 8m
Concrete Blocks (440 x 215 x 100mm):	520
Ready Mixed Concrete (C-35 mix) - Foundation:	1.60m <sup>3</sup>
Ready Mixed Concrete (C-35 mix) - Ringbeam:	0.60m <sup>3</sup>
Ready Mixed Concrete (C-35 mix) - Total:	2.20m <sup>3</sup>
Reinforcing Bar (12mm):	125m
Rendering/Floor Screed - BS1200 Sand:	5m <sup>3</sup>
Rendering/Floor Screed - Cement 50kg Bag:	20
Backfill ¾" Clean Chippings:	6 tonnes

Pool Size:	4.5 x 9m
Concrete Blocks (440 x 215 x 100mm):	590
Ready Mixed Concrete (C-35 mix) - Foundation:	1.80m <sup>3</sup>
Ready Mixed Concrete (C-35 mix) - Ringbeam:	0.65m <sup>3</sup>
Ready Mixed Concrete (C-35 mix) - Total:	2.45m <sup>3</sup>
Reinforcing Bar (12mm):	120m
Rendering/Floor Screed - BS1200 Sand:	6m <sup>3</sup>
Rendering/Floor Screed - Cement 50kg Bag:	22
Backfill ¾" Clean Chippings:	6.5 tonnes

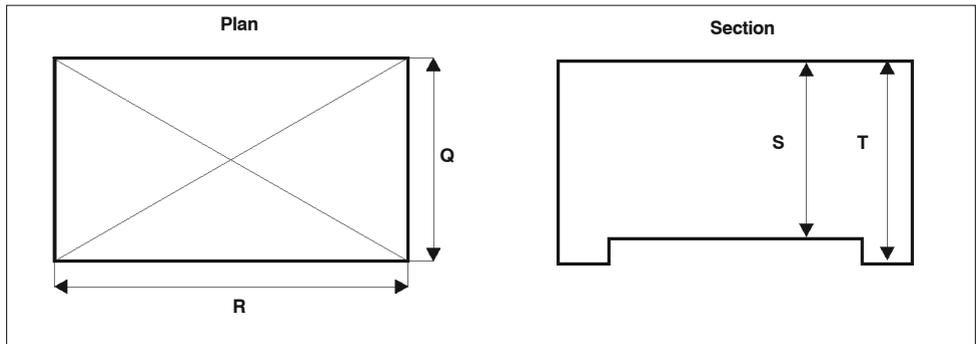
Pool Size:	5 x 10m
Concrete Blocks (440 x 215 x 100mm):	650
Ready Mixed Concrete (C-35 mix) - Foundation:	2.00m <sup>3</sup>
Ready Mixed Concrete (C-35 mix) - Ringbeam:	0.70m <sup>3</sup>
Ready Mixed Concrete (C-35 mix) - Total:	2.70m <sup>3</sup>
Reinforcing Bar (12mm):	132m
Rendering/Floor Screed - BS1200 Sand:	8m <sup>3</sup>
Rendering/Floor Screed - Cement 50kg Bag:	28
Backfill ¾" Clean Chippings:	7 tonnes

Pool Size:	5 x 12m
Concrete Blocks (440 x 215 x 100mm):	730
Ready Mixed Concrete (C-35 mix) - Foundation:	2.20m <sup>3</sup>
Ready Mixed Concrete (C-35 mix) - Ringbeam:	0.80m <sup>3</sup>
Ready Mixed Concrete (C-35 mix) - Total:	3.00m <sup>3</sup>
Reinforcing Bar (12mm):	150m
Rendering/Floor Screed - BS1200 Sand:	8.5m <sup>3</sup>
Rendering/Floor Screed - Cement 50kg Bag:	29
Backfill ¾" Clean Chippings:	8 tonnes

Pool Size:	6 x 12m
Concrete Blocks (440 x 215 x 100mm):	780
Ready Mixed Concrete (C-35 mix) - Foundation:	2.40m <sup>3</sup>
Ready Mixed Concrete (C-35 mix) - Ringbeam:	0.85m <sup>3</sup>
Ready Mixed Concrete (C-35 mix) - Total:	3.25m <sup>3</sup>
Reinforcing Bar (12mm):	158m
Rendering/Floor Screed - BS1200 Sand:	9m <sup>3</sup>
Rendering/Floor Screed - Cement 50kg Bag:	30
Backfill ¾" Clean Chippings:	9 tonnes

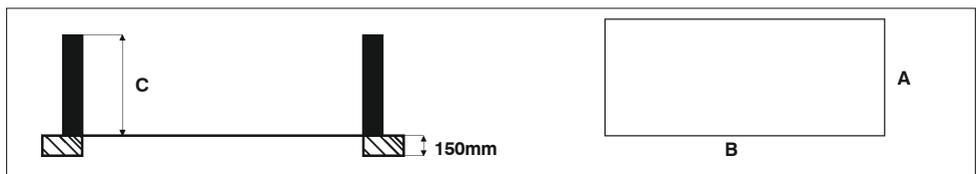
Do not forget when setting your datum point to allow for the thickness of the coping in addition to the depths shown below. All other aspects of construction are the same as for the hopper pool we will describe.

## Excavation Dimensions



Pool Size	Q (m)	R (m)	S (m)	T (m)	Diagonal Equals
4 x 8m	4.8	8.8	1.32	1.42	10.02
5 x 10m	5.8	10.8	1.32	1.42	12.26

## Finished Dimensions



Pool Size	A (m)	B (m)	C (m)	Working Volume - Gallons	Working Volume - m <sup>3</sup>
4 x 8m	4	8	1.27	7,700	35
5 x 10m	5	10	1.27	12,100	55

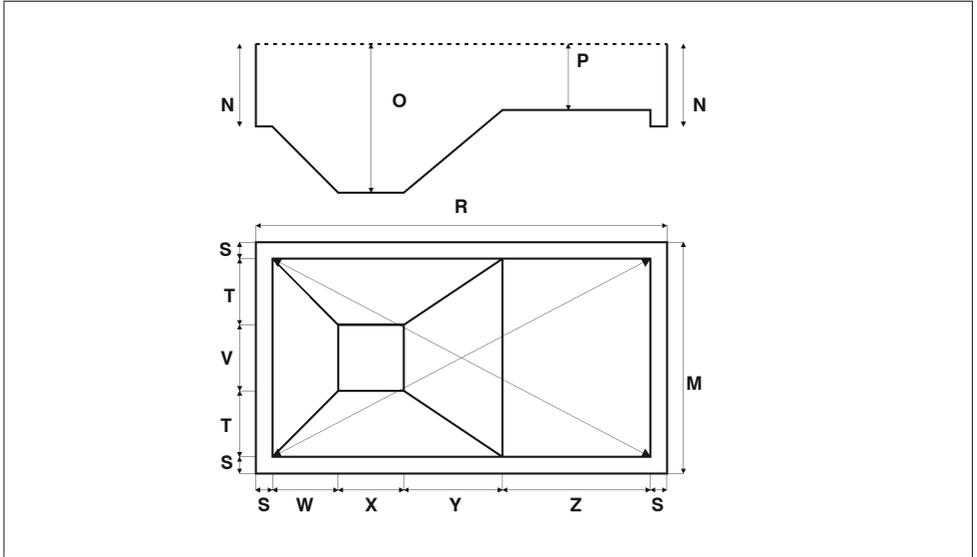
The finished level of the top of the back edge of the pool copings is very important, as the pool surround will be laid to fall away from the pool. Do not overlook this. If it has to join up to a patio or path, set the datum height accordingly.

Before excavating the pool, drive a peg into the ground in an area clear of the workings, which will remain undisturbed during installation. The top of this peg should be level with the top of the pool walls and is the datum point. All measurements are taken downwards from this point to determine the depth of dig.

Remember the coping will go on top of the pool wall and have a bearing on the final level of the surround paving.

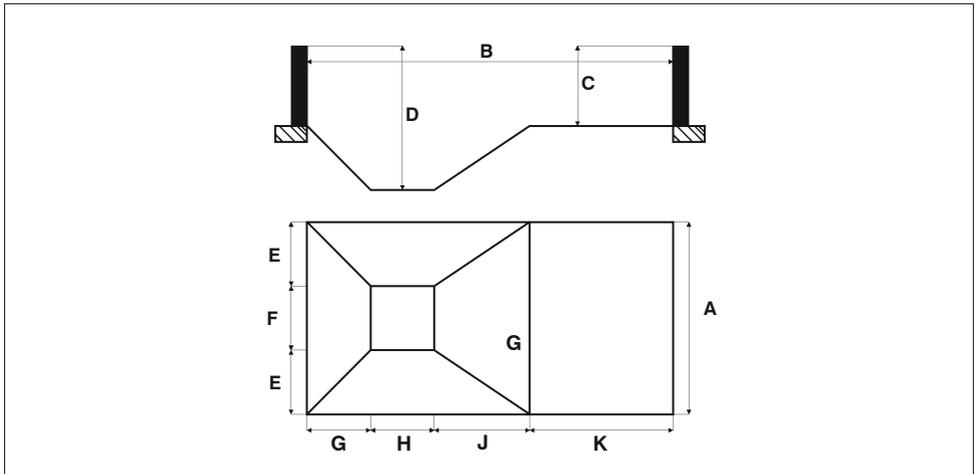
## Excavation

Do not forget when setting your datum point to allow for the thickness of the coping in addition to the depths shown here.

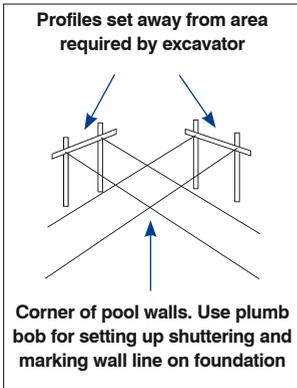


Pool Size	M (m)	N (m)	O (m)	P (m)	R (m)	S (m)	T (m)	V (m)	W (m)	X (m)	Y (m)	Z (m)	Diagonal Equals
3 x 6m	3.8	1.22	1.88	1.07	6.8	0.4	1	1	0.5	1.5	2	2.05	7.79
4 x 8m	4.8	1.22	2.18	1.07	8.8	0.4	1.5	1	1.5	1.5	2.5	2.5	10.02
4.5 x 9m	5.3	1.22	2.18	1.07	9.8	0.4	1.5	1.5	1	1.5	3.5	3.0	11.14
5 x 10m	5.8	1.22	2.49	1.07	10.8	0.4	1.25	2.5	1.25	2	3.75	3.0	12.26
5 x 12m	5.8	1.22	2.49	1.07	12.8	0.4	2	2	2	2	4	4.0	14.49
6 x 12m	6.8	1.22	2.65	1.07	12.8	0.4	2	2	2	2	4	4.0	16.28

## Finished

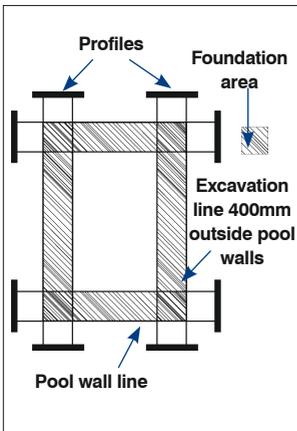


Pool Size	A (m)	B (m)	C (m)	D (m)	E (m)	F (m)	G (m)	H (m)	J (m)	K (m)	Working Volume (Gallons)	Working Volume (m <sup>3</sup> )
3 x 6m	3	6	1.02	1.83	1	1	0.5	1.5	2	2	5,280	24
4 x 8m	4	8	1.02	2.13	1.5	1	1.5	1.5	2.5	2.5	9,460	43
4.5 x 9m	4.5	9	1.02	2.13	1.5	1.5	1	1.5	3.5	3	11,880	54
5 x 10m	5	10	1.02	2.44	1.25	2.5	1.25	2	3.75	3	15,620	71
5 x 12m	5	10	1.02	2.44	1.25	2.5	2	2	4	4	19,580	89
6 x 12m	6	12	1.02	2.60	2	2	2	2	4	4	24,200	110



Set four wooden corner pegs to correspond with the finished pool dimensions and ensure the diagonals are equal. Position two profiles (eight in total), each made from three short lengths of 3" x 1" wood, at each corner of the foundation. Set them well clear of the digger's work area, see diagram on page 10.

When lines are stretched between nails on the top of each profile, the points of intersection must correspond with the four corners of the finished pool dimensions. The diagonals must be exactly equal and checked very carefully. The nails on the profiles are easily adjusted, if required, to represent the chosen dimensions. The advantage of this method is the lines can be removed during digging and easily replaced to identify the exact position of the pool.



The excavation lines can now be added and stretched out 400mm outside the pool wall lines, thus forming a double line around the four sides of the rectangle. Refer to pages 7 - 9 for excavation dimensions for the pool size you have chosen.

Measure and mark on the ground the hopper shape, the shallow end line, and all transition lines (use sand lime or aerosol paint to identify the shape). The excavation size should be set out as follows: Inside pool dimensions plus 800mm on length and width, i.e. 400mm all the way round, which will allow for the thickness of the rendered pool walls and space for the pipes and backfilling. Now is the time to check for square by ensuring the diagonals are equal.

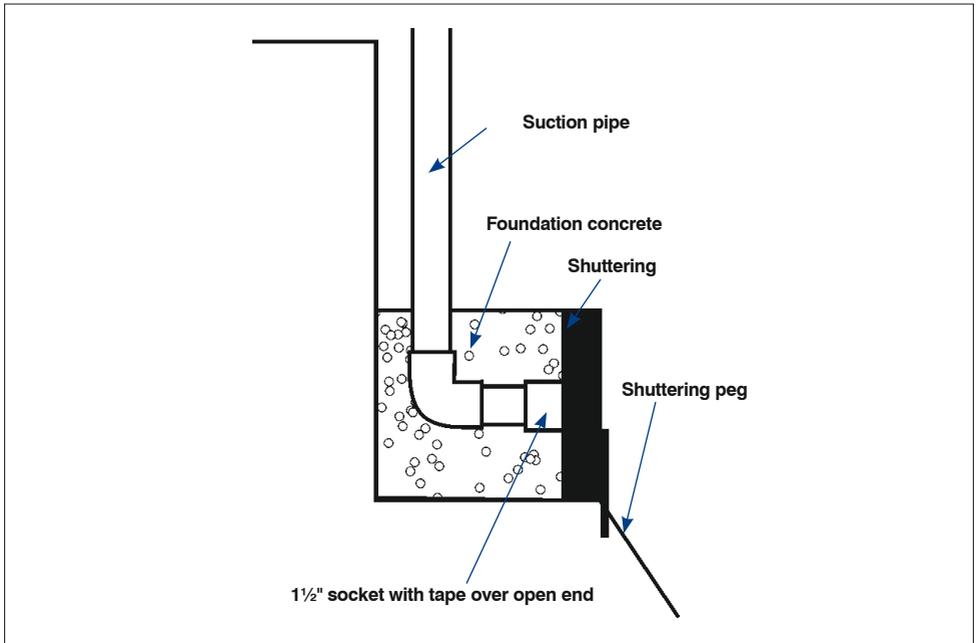
Excavation is best carried out by using a mechanical digger or hiring a self-drive mini digger. It is easier and cheaper if all the excavated soil can be incorporated into the landscaping of the garden. Examples of uses might be to fill in a low area or form a bank or rockery. You will therefore require a dumper to move it on site or a lorry to remove it. Do not in any circumstances use the excavated material as backfill behind the pool walls.

If a roman end or square step unit is to be incorporated make sure it is on site so you can dig out to correspond with the underside profile.

The most accurate method of determining levels is by hiring a site level. Check depths regularly during the course of the excavation to avoid over-digging.

If the subsoil of the pool is clay, or there is a possibility of ground water collecting under the liner, then the pool hopper only should be over-dug an extra 450mm (just the base, not the sides). This will be used later to provide an underpool drain sump, see page 30. If you require a soakaway for the backwash, now is the time to dig it. Also do not overlook to excavate the trench from the pool to the position where the filter and pump will be sited.

The pool walls will have a minimum of 150mm foundations, 1020mm walls. Consequently, the footings around the pool will be dug 1220mm down from the datum point. The actual floor and hopper will be dug approximately 50mm deeper than the finished pool to allow for the 50mm finishing layer of sand/cement render on the pool base. Any areas of the floor which are mistakenly dug too deep must not be filled with excavated material. They should be made up to the correct level with 18:1 lean mix concrete.



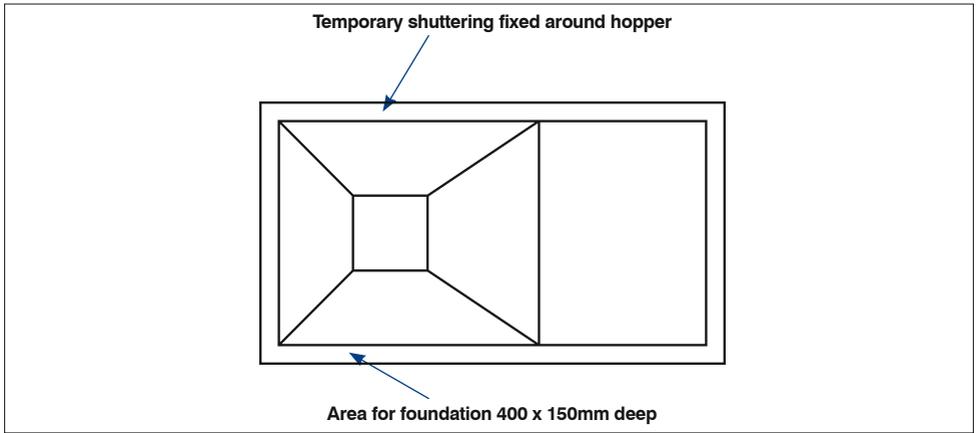
Provision needs to be made for one pipe to run under the foundations, which will later be connected to the main drain in the bottom of the pool. However, if you have to deal with ground water then a second pipe will also be necessary. This should be on the side nearest to the filter position, in line with the centre of the hopper. Placing the main drain and under pool drain pipework in the wall footings will require a socket to be fitted to two lengths of pipe, the open end should be covered with adhesive tape. These pipes are laid across the bottom of the foundation trench to butt up tight against the inside of the shuttering. The pipes will have 90° elbows fitted, with a length of pipe to a position which will allow them to be plumbed back to the plant room below the ring beam.

When the shuttering is removed, it will expose the tape-covered end of the socket ready for connection down to the fittings in the hopper (please refer to Appendix A on page 53 for instructions on gluing pipework).

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Control of ground water is essential during construction. This will require an over dig of 450mm in the centre of the deep end. Concrete blocks can be placed in this pit with the second pipe laid in it, see page 30. This pipe will require a collection tube on the end to allow for the ground water to pass to the diaphragm pump. Following this, a layer of hard core should be laid on top with a finishing layer of dry lean mix concrete. Make sure you leave sufficient room above the concrete to place the main drain. If the site has a ground water problem then you will need to fit a hydrostatic relief valve and collection tube to the main drain to remove it. A diaphragm pump can be used, this can be connected to the underpool drain at the time the floor and liner are being installed.

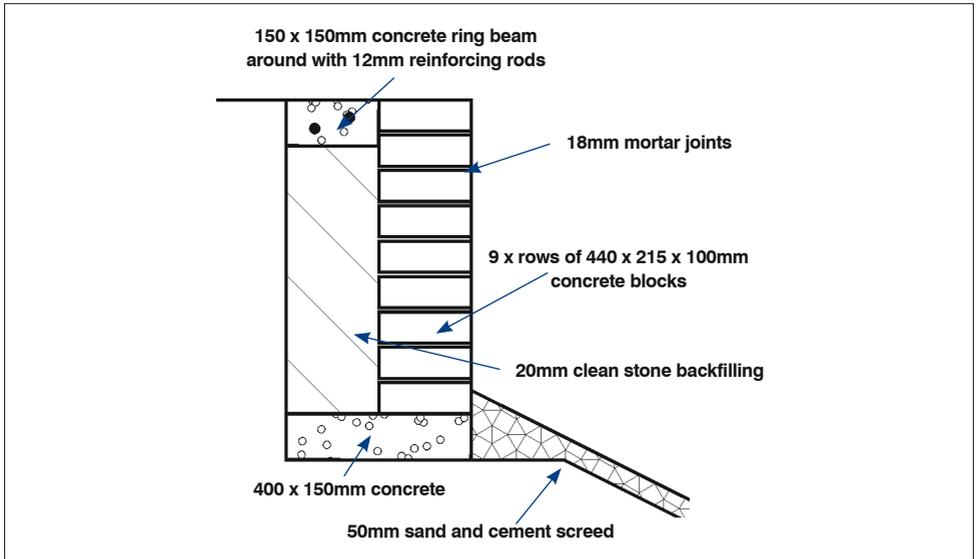
See page 30 for details.



The concrete foundation for the walls should be 150mm deep and 400mm wide. If the foundations are to be set on unstable ground, two pieces of 12mm reinforcement bar must be incorporated in the concrete. The foundations around the hopper end of the pool can be dug with the digger as it means reducing the levels around the hopper perimeter by 150mm. The foundations around the shallow end will have to be dug by hand to produce an accurate 150mm deep foundation trench.

Due to the slopes of the hopper it is necessary to fix temporary shuttering around this area, for retention of the foundation concrete.

Scaffolding boards on their side, or suitable timber with securing pegs driven into the slope, will provide the shuttering. Re-fix the pool wall lines and using a plumb line mark the four corners at foundation level. Using a straight edge and spirit level mark the line for the shuttering. Make sure the shuttering is not set outside the wall line as the block walls must be set onto the foundation. Pegs must also be hammered into the ground within the foundation trench, in order to establish the top level of the concrete. Using the site level, ensure the top of the pegs are level and 1070mm below the datum. Alternatively, or in addition, the shuttering can be fixed level along the top edge as an extra reference for laying the concrete. Then in one action lay a C-35 1:2:4 mix of concrete around the foundation to this level.



The majority of pools are set below ground level and consequently have the benefit of support from backfilling. We use the flat block method as described later which does not have the complication of reinforcement as in other building methods.

It must be stressed, this method is for pools completely below ground. For pools above-ground, the double skin or hollow block method of construction with reinforcement must be used.

Building and rendering the pool walls around the hopper end will require temporary scaffolding to work from.

Reposition the string lines attached to the profiles, the four corners of the pool are where the lines intersect. Check to ensure they are square before any blocks are laid. The walls are built with 450mm x 215mm x 100mm solid concrete blocks laid flat on their side. Each half-bond forms a 215mm solid concrete wall of great stability.

Using a spirit level or plumb line establish the points directly below and mark the four corners of the pool on the foundations.

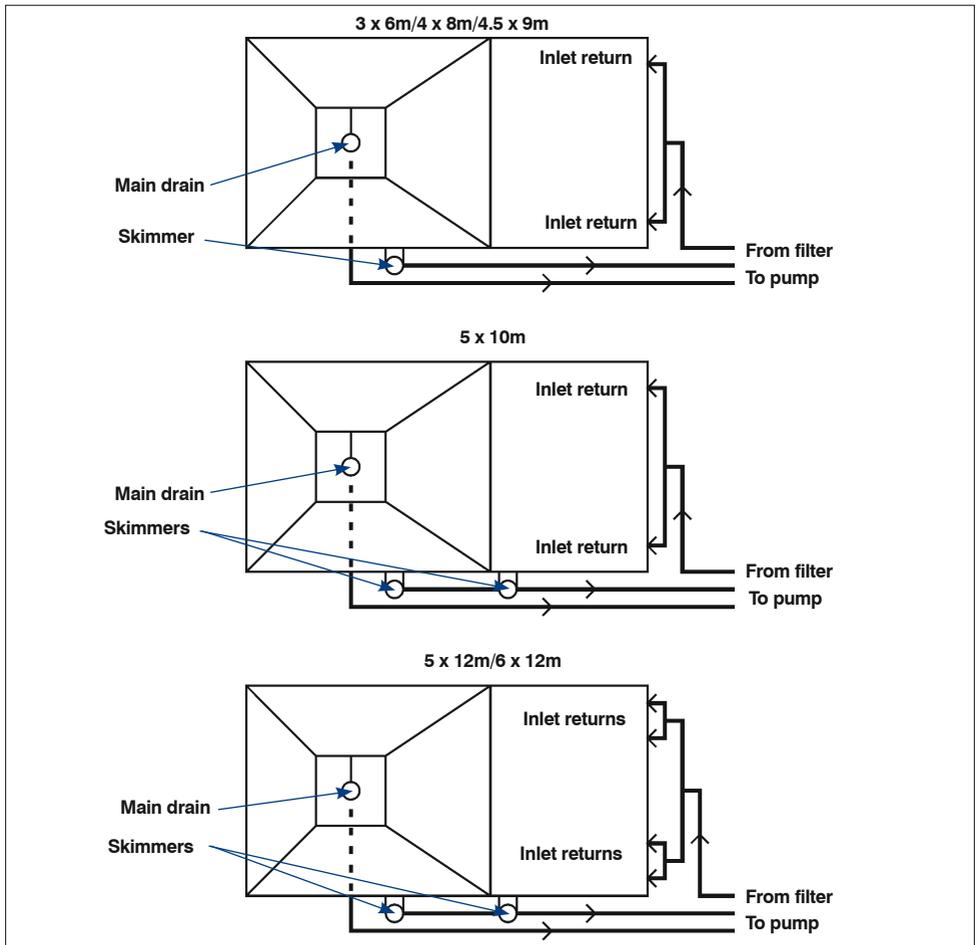
When the walls are completed they need to be finished with a 12mm sand and cement render. To allow for this extra thickness, mark the foundations out from the four corner points to identify the position of the blockwork walls.

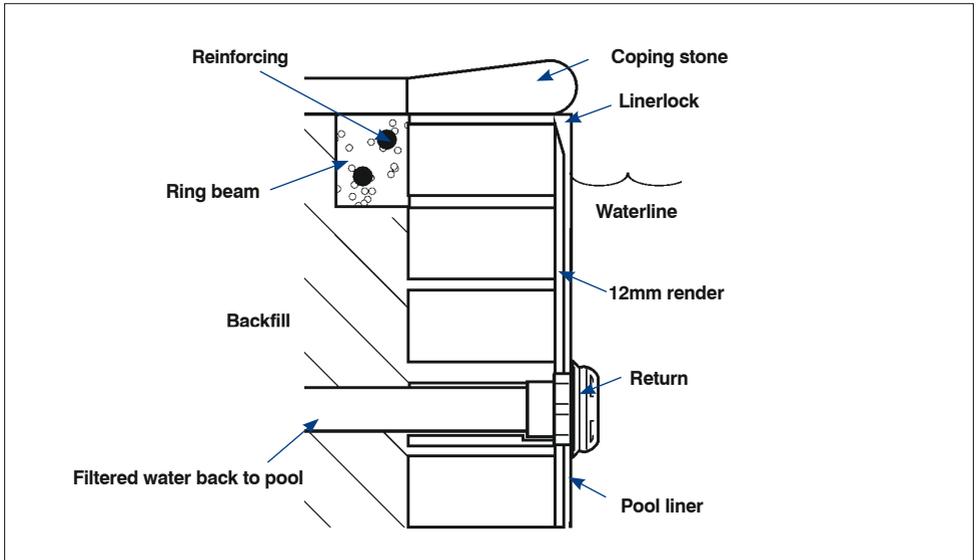
The joint between the blocks has to be approximately 18mm thick, to achieve the 1070mm wall height with nine rows of blocks (eleven for flat bottomed pools).

Check the height of the walls during the installation and adjust the mortar bed accordingly to ensure finished wall heights of 1070mm are obtained (flat bottom pools require a wall height of 1270mm).

The positions of the pool fittings are shown on the plumbing layout diagrams below, they should be built into the walls as building proceeds.

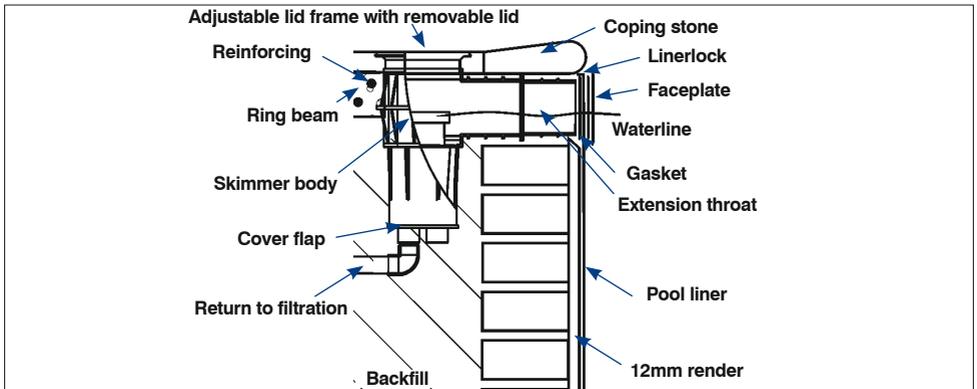
In all cases, except the underwater light, the front plate of the fittings must protrude from the wall 12mm, as the subsequent rendering will make up this 12mm difference. (See skimmer detail on page 23 for the relevant positioning.)





## Plumbing Layouts For Pool Sizes

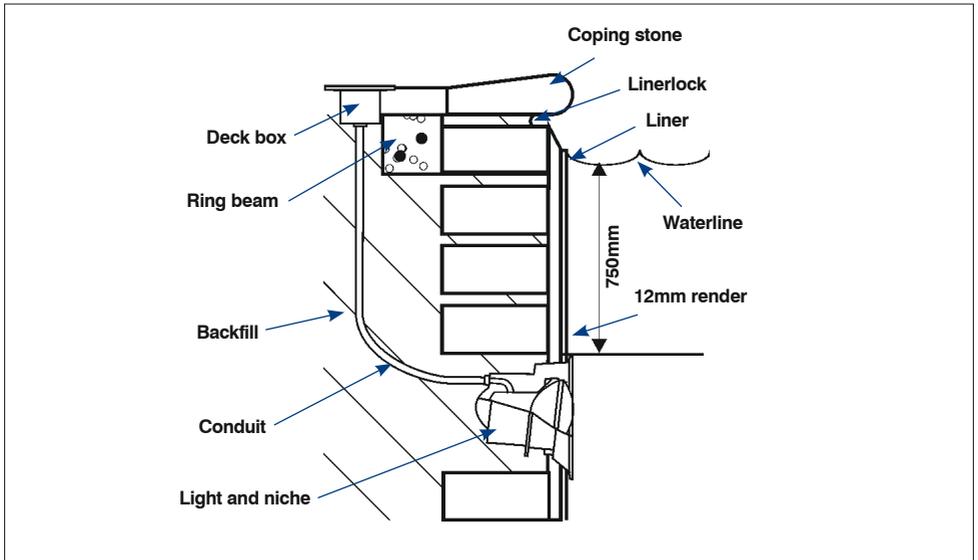
The inlets which return the filtered water to the pool should be plumbed with a socket nipple and short length of 1½" pipe and then cemented into the wall on top of the fourth course of blocks, as shown in the diagram. Remove the flange, gasket, eyeball housing and screws and store carefully for subsequent fitting. The front plate of the fitting must protrude 12mm from the face of the wall prior to rendering. Cover the front of the inlet with masking tape to prevent any debris entering the pipework.



The surface skimmer, or skimmers in the case of larger pools, remove floating debris and water from the pool to be filtered. They must be installed 25mm down from the top of the pool wall.

The water level in the pool must be halfway up the mouth of the skimmer, therefore the pool water level is approximately 100mm from the top of the pool wall. The skimmer(s) must sit in the middle of the side where a prevailing wind will blow debris into the skimmer, acting as a pool vacuum point.

Remove and carefully store the basket, weir assembly, flange, gaskets, front plate and screws from the body of the skimmer. Invert the skimmer and use the 1½" plug supplied to plug-off the outlet port on the throat side of the unit. Screw a plain x threaded nipple into the remaining outlet port and glue to a 90° elbow with its open port facing the direction you intend taking the suction pipe back to the filtration plant. Clean off and remove any small plastic nibs from the faces of the skimmer and the extension throat. Glue the extension throat to the skimmer as detailed in Appendix A. Using the four small self tapping screws, secure the extension throat to the skimmer joint and set it aside to harden. The skimmer is carefully bedded on a bed of cement, with the front flange protruding by 12mm prior to rendering. At this stage a piece of block or brick should be placed on top of the skimmer to help keep the skimmer in position while the mortar is hardening. Close the flap in the base of the skimmer over the outlet to prevent dirt ingress.



An underwater light as shown in the diagram below makes the swimming pool safer at night and transforms the pool during a barbecue or party. One light is sufficient for pools up to 4.5 x 9m, but larger pools will benefit from the use of two or more lights.

The light or lights should be positioned on the side of the pool nearest the house or the sitting area. In this position the pool will be lit up without seeing the light itself and causing a glare. The best position for the light, if it complies with the above recommendation, is in the centre of one of the long walls. The underwater light niche is installed on the third course of blockwork.

Before the niche can be built into the wall, the backing ring must be fitted to the light niche with four stainless steel self tapping screws provided, in the positions shown by the light installation diagram (found inside the light's box).

Remove the "guts" (bulb and cable) of the light by unscrewing the two large stainless steel securing screws, store carefully together with the gasket, front plate and screws. The front flange of the light must protrude 19mm from the wall (12mm of which will be finished with render).

This flange, after rendering, must be proud of the wall by 6mm; otherwise the faceplate will not bed correctly. The flexible plastic conduit is connected to the back of the light niche, using the built-in watertight gland, ensure the conduit joint is waterproof by applying silicone sealant to the threads as it will fill with water once the pool is full. The other end will be fitted to the bottom of the deck box when positioned behind the coping at paving level. The conduit must be installed as a long slow curve without any kinks, ensure it is not damaged as this could make passing the cable to the deck box difficult later.

Details of electrical connections for the underwater light/lights are mentioned later in the electrical section on page 48.

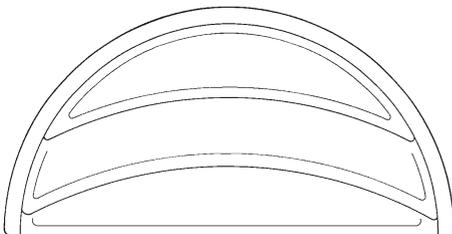
The concrete foundations should be continued around the entire pool, including the step section. The excavation for the steps should be dug out at an angle of 45° leaving 80mm of clearance under the steps for subsequent concreting. The step unit should be set in position with blocks providing temporary support and with the inside face protruding 12mm from the face of the wall to allow for subsequent rendering.

The first row of blocks should butt tightly against the side of the step unit. At this level, drill a 12mm hole through the side of the step flange, cut a butterfly wall tie and pass it through the hole. The other end of the tie will lie on top of the block and be anchored when the next block is laid. These tie reinforcements should be used at every course of blocks.

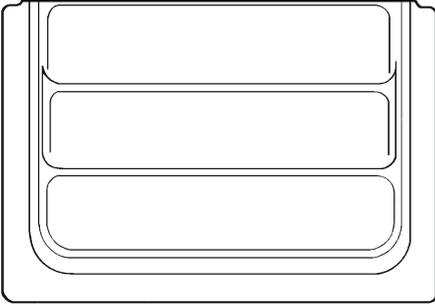
Once the blockwork has set a few barrows of concrete under each end of the step unit will stabilise the unit. Use a mixture of 6:1 dry concrete to in-fill under the steps. After placing the concrete under the steps, tap the treads with a broom handle to identify any hollow voids and ensure they are fully supported, without voids. This operation must be done in stages, with care being taken not to move the steps out of level. One step should be completed at a time with plenty of tamping being undertaken on each level.

Note: Spa steps require additional plumbing connections.

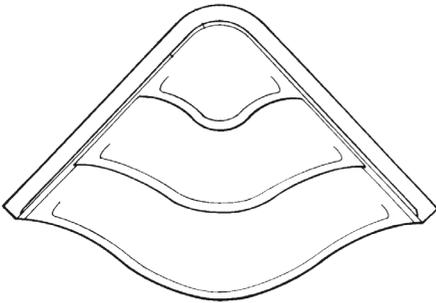
## Roman End



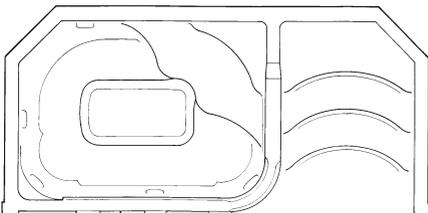
## Square Steps



## Corner Steps



## Spa Steps



After building the walls and incorporating the fittings, the interior of pool walls should be rendered. The four internal corners should be rounded out with strong sand/ cement mixture to form a 178mm radius corner. To achieve a radius you should cut a plywood template and fix to the top of the pool wall. Due to the thickness of the render it is best partially done one day and completed the next.

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The life of the liner is in part dependent on the smoothness of the pool walls and the best method is to render the walls with a soft pit sand (do not use sharp sand) and cement render. Set lengths of timber around the top of the wall, so they overhang by 12mm. This will provide a line against which the rendering can be measured. The timber is held in place by loose concrete blocks which will be removed once the rendering is completed. Use a mixture of 4:1 sand and cement.

A good smooth finish will lengthen the life of the liner. Many people employ a local plasterer to render the walls, which can be completed in a day.

Great care must be taken when rendering not to damage the faces of the pool fittings or fill the screw holes with cement. Masking tape over the face of the fittings will protect them.

The scaffolding can now be removed from the pool and the floor shaping carried out. If you have encountered any ground water in the bottom of the excavation, you will already have over-dug the bottom of the hopper by 450mm and positioned a second pipe under the foundation. This pipe can now be used to remove the water.

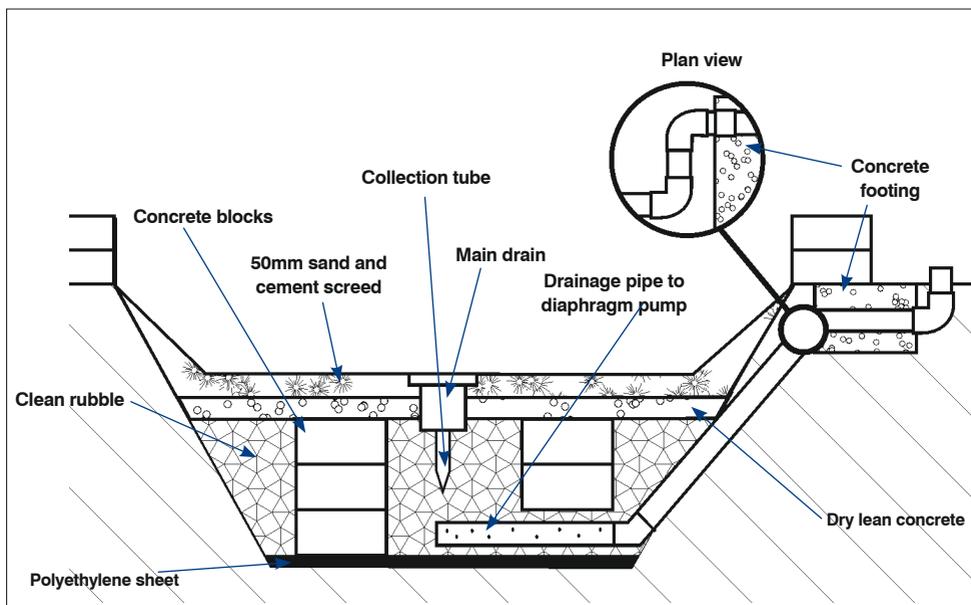
Hire an electric diaphragm pump with suction and delivery hoses which will pump away the water. Make sure the water is pumped well away and does not find its way back into the excavation.

Any loose silt should be dug out and removed to leave a firm base. Concrete blocks should be placed around the sides to form a 450mm deep sump. Place a polyethylene sheet on the floor of the sump and cover with a layer of clean rubble.

One of the pipes positioned under the wall foundations should now be extended down the side of the hopper and connected to a collection tube in the centre of the pit near the bottom. If a collection tube is not available, this can easily be fabricated by using a 300mm length of 1½" pipe and drilling approximately 80 holes with 6mm drill. The open end of this pipe must be capped at one end.

The diaphragm pump can now be connected to this underpool drainage pipe and left running continuously to suck the water from the bottom of the pit. This will keep the water level 450mm below the surface, enabling you to continue building the pool. Filling the sump with clean rubble can now be completed. The individual pieces should not be any larger than 50mm.

Broken blocks or bricks are ideal and this rubble should be carefully placed all round the collection tube. Do not use gravel, because any small stones present will be sucked into the holes in the collection tube and can cause a blockage. Rubble should also be used on the outside of the concrete blocks forming the sump, as per the diagram in order to create a firm base for the pool floor.



The exact dimension of the hopper should now be marked out. You will see from the dimensions the shallow end finished floor level will be 1020mm from the top of the wall or approximately 50mm up the lowest block. It is good practice to mark this wall/floor transition line with lime or sand all round the inside of the pool.

Measure along this line and mark the hopper dimensions and the shallow end line as shown in the finished pool dimensions on pages 10 - 13. Stretch lines across the pool and using a plumb line or spirit level, mark the four corners of the hopper bottom. Hammer pegs into the ground to correspond to the finished floor level. Stretch a string line diagonally between the top of these four pegs, the intersection point will correspond with the centre of the main drain which will be set 25mm lower than the top of the pegs.

If the excavation has an under pool drainage pit, it will have been over-dug by 450mm and filled as described in the previous section Under Pool Drainage. This area should now be finished with 18:1 dry lean concrete. Where appropriate this should be extended to areas of the floor and slopes where there might have been any over-dig. This should be carefully levelled over the entire floor and slopes, leaving 50mm for the final sand/cement screed. This sub floor will set overnight and the floor screed can be completed the following day.

Concurrent with work on the under pool drainage, the main drain should be connected to the pipe laid under the wall foundations. This will later be extended to the suction side of the filtration plant. Two 90° elbows side by side are used at the connection inside the pool to give the correct angle on the pipe going down to the main drain. Remove the main drain from its box leaving the flange, grille, gasket and screws. Do not remove the plastic tape over the fixing holes. This is necessary to keep the holes free of debris during construction. The bottom hole in the main drain should have a 1½" threaded plug fitted or a collection tube if a hydrostatic relief valve is to be fitted.

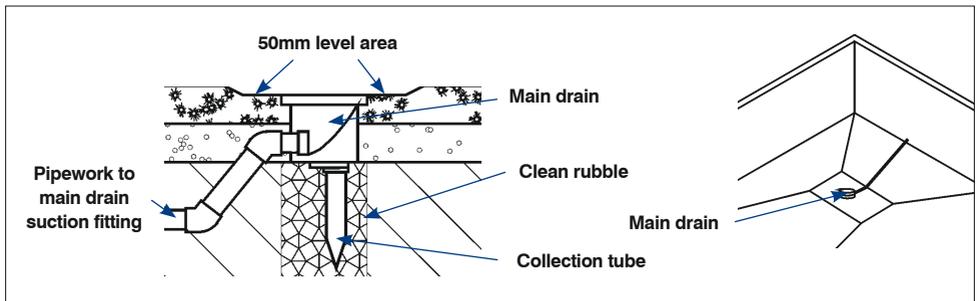
The side entry should be fitted with 2" - 1½" reducer and 1½" socket nipple, then fit two 45° elbows with a 150mm length of 1½" pipe (see drawing on page 34), mask off elbow with tape to prevent ingress of mortar etc.

The pipes should be cut to length, cleaned and glued into the 45° elbow ensuring the top of the drain is flat, level and positioned 25mm lower than the finished depth of the hopper. The main drain will, therefore, be at the lowest point in the pool. This will make emptying the pool easier should it ever be necessary. To ensure this position is maintained concrete should be placed around the main drain, and all pipe trenches within the pool should be concreted to prevent movement and settling. The open end of the pipework should be returned up the side of the excavation at the back of the wall to approximately 300mm below the datum point. This should be thoroughly sealed with masking tape to prevent any debris entering the pipe.

Referring to the detail on page 11, identify the transition point between the shallow end finished floor level and the slope. Drive in a peg at both sides of the pool, then stretch a line from each peg to the corresponding peg in the hopper. This will identify the transition point between the sloping floor and the two side reverses. The other two transition points, between the hopper and the deep end wall corners, are identified in a similar way. Before commencing screeding check all areas of over-dig have been made up with an 18:1 dry lean concrete mix. The area where the slope of the hopper meets the foundation is likely to need building up. The screed depth should not exceed 50mm.

When screeding the hopper, remember you have set the main drain 25mm lower than the hopper floor, which should be dished down to the main drain. Ensure there is an area of flat screed 50mm around the main drain to allow for the drain cover which overlaps the top of the drain to sit correctly.

Use the same soft pit sand for the floor as you used for the walls. Mix a 6:1 damp, not wet, mix, to be spread and compacted with a wooden float and then steel floated to a finish. By the following day the surface should be firm enough to be carefully walked on. However, it will remain porous allowing water to pass through it and drain away.



Backfilling behind the pool walls can now be started, using clean 20mm ( $\frac{3}{4}$ " ) stone or pea gravel. Initially this is only necessary up to the level of the inlet fitting(s). The return pipework should now be connected to the inlet(s) with a 90° elbow (or one 90° and one tee if two inlets are fitted). See Appendix A for plumbing details. The pipe from the main drain should also be connected and the pipes laid side-by-side but not touching each other. Connect the pipework to the skimmer, making three pipes in total. These should be taken back to where the filtration equipment is to be sited.

Backfilling with 20mm ( $\frac{3}{4}$ " ) clean stone or pea gravel can now continue until it is 150mm from the top of the wall.

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Scaffold planks should be positioned on their edge as shuttering, 150mm away from the pool walls. They should be held in place with pegs or concrete blocks. Two 12mm reinforcing rods should be placed ready to be incorporated in the concrete ring beam. The concrete is poured in the shuttering with the 12mm enforcement rods placed in the centre. Filling can then be taken to the top of the pool wall and, if steps are fitted, the concrete ring beam must continue round them.

Form the shuttering for the ring beam around the Roman end with loose concrete blocks. These can be removed when the concrete is set. The concrete ring beam is to protect the top 150mm of the pool wall which is the most vulnerable when ice in Winter can exert pressure on the top of the wall. The ring beam must be taken round the skimmers to support and protect them. At reinforced bar joints, overlap by 400mm minimum.

If the top of the blocks are not absolutely flat and level, this must be adjusted before the linerlock is fitted. If necessary a sand/cement screed should be accurately levelled around on the top of the wall. If this is not perfectly level the discrepancies are easily seen when the coping is laid which can spoil the look of an otherwise perfect pool.

The linerlock can now be fitted to the top of the pool wall using 20mm ( $\frac{3}{4}$ " ) masonry nails at approximately 450mm centres. They should be nailed at the back of the flat linerlock section to avoid the possibility of chipping off the face of the top block. Start by fixing the four pre-formed linerlock corners, then cut and fix the straight lengths making sure the edge is flush with the inside wall. Where a roman end or rectangular end is fitted the linerlock should overlap the step unit up to the liner edge of the faceplate. Drill and fix with a self tapping screw at this point.

Once the linerlock has been fitted to the perimeter of the pool lay a small fillet of sand and cement mortar along the back edge of the linerlock to ensure an airtight seal exists when you come to vacuum the liner into place.

If a light is included, fit the light guts by pushing the cable up the conduit from inside the pool to the deck box. Then tighten the gland nut around the cable to prevent water entering the conduit when the pool is filled. Do not cut the excess cable off, this is so the light can be removed underwater and lifted up to the pool surround to change the bulb.

The remaining cable should be coiled around the light for fitting into the niche. Make certain all the faces of the pool fittings and underwater light(s) if fitted, are completely clean, ensuring all the screw holes are clear. Also remove the protection from the main drain.

Now inspect the pool walls and floor, using an old steel float, shave off any nibs and rough areas of mortar, and make good any defects with a strong mix 1:1 sand and cement. Flush this mixture off with an old wetted paint brush. Then using a soft sweeping brush, sweep the entire pool shell surface and vacuum away any debris or dust paying attention to any mortar trapped in the fittings and linerlock.

A small piece of grit trapped under the liner looks much larger than it really is!

After cleaning the fittings and making sure all fixing holes are clear, the gaskets should be fitted. The inlet fittings and underwater light have self-adhesive gaskets. Peel off the protective paper and carefully fix to the fittings. In the case of the main drain and skimmer, the gaskets are not fitted until the liner is installed.

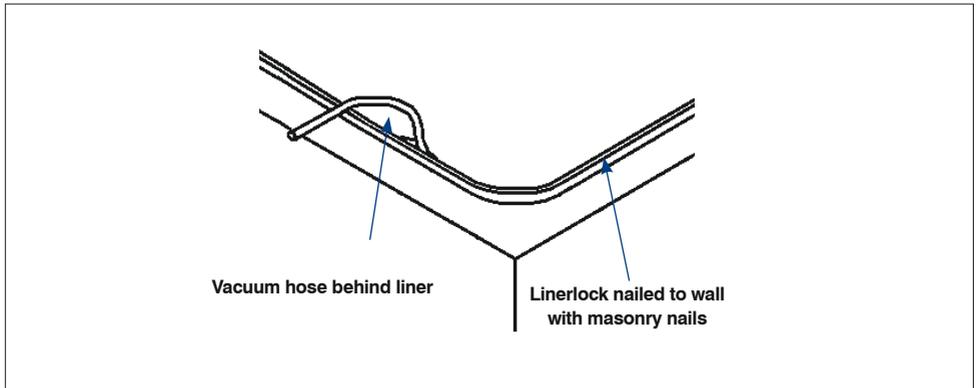
To avoid damage, never open the liner box with a sharp knife. During fitting anyone inside the pool must wear clean, soft shoes to avoid damage. Do not wear trainers as stones get stuck in them.

All Swimmer liners are intentionally made slightly smaller than the pool shell, so they stretch into shape without any wrinkles. If possible the liner should be fitted on a warm sunny day. If this is not possible leave the liner overnight in a warm room to become pliable. The liner should be carefully carried into the pool and laid down in the centre of the shallow end floor - never drag the liner. A label will be found indicating the deep and shallow end and the liner should be unrolled down the length of the pool and unfolded. Welded to the top edge of the liner is the linerlock beading which will clip into the linerlock already secured around the top of the pool walls.

Start in one shallow end corner by identifying the exact centre of the corner at floor level and with your foot push this into the corner of the pool. Keeping the pressure on this corner, lift the liner wall and press the beading into the linerlock until the liner is held in position. Fix the next corner and continue round pool. The liner is now fixed in its basic position.

If a step unit is fitted lay a scaffolding board across the top of the step entrance. Pierce the liner bead at regular intervals, pass a piece of rope through and loop over the scaffold board. Tie off tightly to hold the latter in position over the step entrance.

The use of a commercial vacuum cleaner is recommended to position the liner as it will suck the liner into the pool shell removing creases before filling commences.



At this stage, check the three pipes leading from the pool and seal off the open ends with masking tape. Fit the frame and lid on to the skimmer and tape up any gaps.

The gland around the light cable in the light niche should prevent air entering behind the liner as long as it has been tightened to the cable as described earlier. The liner is now ready for installation using the vacuum cleaner.

The suction hose should be carefully pushed down behind the liner until it is 150mm from the bottom of the wall. This is best positioned approximately 300mm from a hopper end corner, after unclipping a small section of the liner beading from the linerlock. The gap around the hose will have to be sealed with masking tape and the vacuum can now be switched on. After a few minutes the liner will be sucked back against the walls and floor. This will make it easy to check the liner is fitted correctly, with all four corners in exactly the right place and the floor and seams correctly fitting at the base of the walls. Do not worry if there is tension at the bottom of the walls and the liner does not suck back completely, there should however be equal tension all round. If there are any creases from the top of the wall to the floor seam, this indicates the top of the liner has to be moved round a little. To correct this problem, switch off the vacuum, release small lengths of the liner, adjust, then switch on the vacuum. Repeat this again until you are satisfied the liner is in the correct position.

When satisfied the liner is fitted correctly, take the main drain flange, gaskets, cover grille, screws, Philips screwdriver and knife down to the main drain. The drain can be easily felt through the liner and each screw hole punctured with the point of the Philips screwdriver. Both gaskets are positioned under the flange and on top of the liner, and the eight screws are securely screwed home. It is best to screw these lightly first and then screw home the diagonally opposed screws until all are tight.

Simply remove the liner material in the centre of the main drain with the knife; finally fit the cover grille into position.

Note: Cutting out a pool fitting confirms acceptance of the liner.

As soon as the liner is in its correct position start to fill with water, make sure to eliminate any creases which appear on the floor of the pool by using your hands to push them out towards the side. If there are creases do not put more than 30mm of water in the pool, as you will not be able to remove them due to the weight of the water. If you cannot remove them, stop filling and remove some water.

Only cut the liner around the pool fittings when the water level is immediately below each fitting, this will avoid creases due to liner stretch when the pool is filled.

## **Underwater Light**

Locate the twelve holes through the liner and pierce them with a Philips screwdriver. The faceplate can now be fitted and securely screwed into place, tighten diagonally opposed screws in rotation until firm. After the faceplate has been fitted, cut and remove the inner circle of the liner.

## **Return Inlet(s)**

Locate the four holes in the fitting and pierce them with a Philips screwdriver. Next cut and remove the circular hole of liner from the centre and firmly screw the flange into place, rotating the tightening up procedure. The eyeball housing can now be screwed into place.

## **Skimmer**

Locate and puncture the eight screw holes and cut out the inner rectangle of liner. There are two gaskets to fit between the liner and the face of the skimmer, which are easily positioned by placing them behind the liner into a top corner. Hold them in position by pushing a small nail through the liner and gasket holes and into the top hole in the skimmer. This will allow you to fix the faceplate and retain the gaskets in position. Remove the nail once sufficient screws are in place. Again screw up carefully and in diagonal rotation. After the skimmer faceplate, gaskets and cover plate have been fitted, the pool filling can continue until the water level is half way up the skimmer mouth.

Step units have a gasket fixed when supplied which remains in position but should be checked prior to filling the pool. Make sure the water level (approximately 250mm in depth) is immediately below the bottom of the faceplate. Locate the faceplate and secure the top screw on either side. Standing in the water in bare feet, place the side of one foot against the bottom of the step unit and press the liner downward into the wall floor joint, then secure the screw immediately above. Use this method on all the bottom row of screws to ensure, when full, the water pressure will not stretch the liner further after screwing up the faceplate. The stretching procedure is essential especially when the liner is fitted in cold conditions.

When the faceplate has been securely screwed into place, the scaffold board can be removed and the excess liner cut out of the entrance of the steps with a sharp knife.

First mix up a grout of cement and water and spread on top of the pool walls. This ensures a good bond. Mix up a 6:1 mixture of sand and cement and level around the top of the pool up to the required height, and just above the top of the linerlock. This screed must be perfectly flat and level, as the coping stones are bedded directly on to this screed. The four corner coping stones are the first to be positioned, after pasting the back of these corner copings with a thick slurry of white cement and water. The pasted corners are positioned on the corners so the flat base lays 3mm clear of the top of the linerlock. The linerlock is fully covered with the open face flush with the inside edge of the pool wall. When the four corner stones are in position, a taut line can be stretched along the front edge to provide a perfect straight line for positioning the coping. As there may be some slight deviation in thickness of the copings, some copings may require a little thicker bed to make a perfect top line.

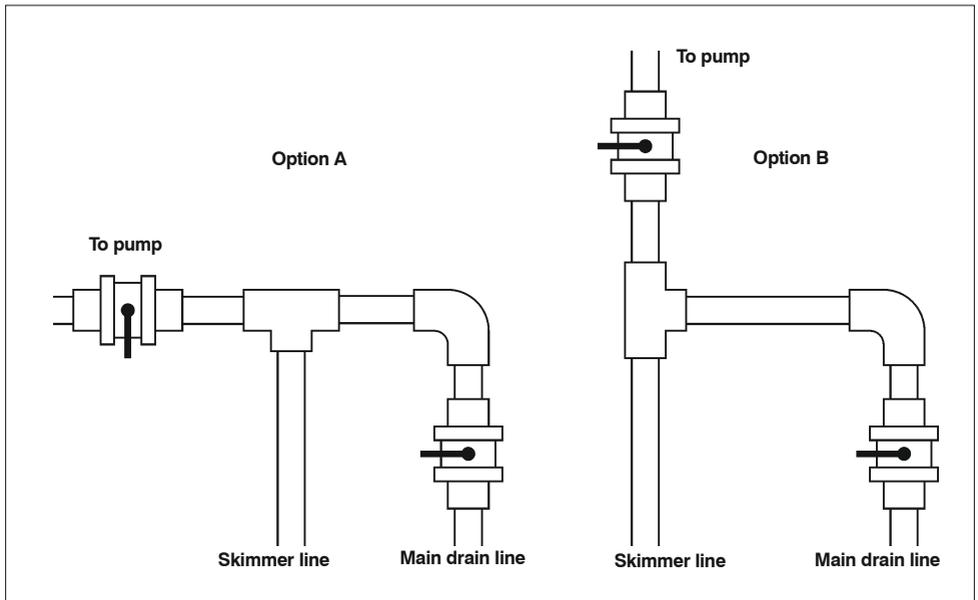
A 12mm gap should be left between the stones to allow for pointing. The last coping in each line will probably require cutting in length, which is easily and quickly carried out with a disc cutter. In view of this you may wish to work from each end, so the cut coping is in the centre of the wall.

The pointing mixture of 1:1 silver sand and white cement should be carefully trowelled into the gaps, wiping off any surplus from the coping stones with a damp cloth. The pointing mixture should not be too wet and of putty-like consistency.

Each pool kit includes a pump and filter, which is capable of filtering the pool water in under eight hours. The pool water is sucked into the pump and then pumped via the multiport valve into the top of the filter. It then passes through the media, before returning to the pool via the multiport valve and return pipe. Sufficient pipework and fittings are included in the kit to position the filter within 3m of the pool and on the same level as the pool surround. The plumbing round the pool terminates in three separate pipes. One return line to the return inlet fittings, and two suction lines from the main drain and skimmer. These two suction pipes are connected to the pump with a three way valve assembly, as per the diagram below. The valve controls the sump and skimmer lines giving the options of skimmer line only, both lines fully open or closed.

Two alternative methods are shown for connecting the skimmer and main drain lines with control valves into the pump. Following this layout will ensure compliance with SPATA guidelines and suction is never limited to the main drain only.

Note: All valves are shown in the closed position.



The outlet from the top of the pump is connected to the multiport valve at the position marked pump. The third pipe to the pool is the return line, which is connected to the multiport at the position marked return. When the filter is in position and pipework connected, the media should be added by removing the filter lid and pulling out the top spreader - a plastic, funnel shape with holes in it. Tuck the edges of the protective polyethylene wrapping over the sides of the filter to protect the threads from the media. The centre filter tube will present an open pipe, which should be blocked with a piece of rag to prevent any media going down this tube. Before filling add 10" of water to absorb the shock of the incoming media to prevent damage to the underdrain fingers, then fill approximately two-thirds of the tank with the following loads.

<b>Filter Size</b>	<b>Purity Required Total</b>	<b>Purity Required No. of 20kg bags</b>	<b>Sand Required Total</b>	<b>Sand Required No. of 25kg bags</b>
406mm/16"	43kg	2	50kg	2
457mm/18"	64kg	4	75kg	3
610mm/24"	107kg	6	125kg	5
762mm/30"	170kg	9	200kg	8

Remove the temporary plug from the centre tube, replace the top spreader, rinse some water round the threads at the top to remove any media and screw up the filter lid firmly.

## Backwash Connection

One final plumbing connection is necessary for backwashing the filter. When cleaning the filter, the dirty water is pumped out of the backwash port on the multiport valve. This water should be piped to a drain or soakaway.

It is essential a competent, qualified electrician should undertake this work.

ALL ELECTRICS MUST BE PROTECTED BY A 30 MILLIAMP R.C.C.D.  
SAFETY DEVICE.

- The pump must be protected by a push button starter with thermal overload to protect the motor. Starter overloads are supplied in different sizes and the 4-8 amp model is used for motors up to 1hp. A 7-15 amp starter is used for pumps 1hp - 2hp.
- The cable from the deck box of the underwater light to the transformer, which is usually installed on the wall in the filter house, should be 4mm 2 core PVC insulated armoured cable (providing the distance is under 20m in length). If there is more than one light on a pool, a separate cable must be run from each deck box to the transformer. To accommodate the different lengths of cable from the deck box there are separate tappings on the transformer. These increase the electrical output and overcome the resistance in the cable.
- These tappings should be used in accordance with the table found in the transformer box.
- If the bulb unit has to be changed, the procedure is easily carried out without lowering the water level. Undo the two securing screws, remove the “guts” of the light by uncoiling the surplus cable wound around the light and lift the unit onto the paving. The bulb can now be changed and the light refitted. Never switch the light on when it is not covered with water.

A range of pool heating options are available including solar, gas, oil and electric heating. It is also possible your central heating boiler may have sufficient capacity to heat your pool in the summer. Your supplier will advise you on the various options available.

Heaters are always installed after the filter, so the filtered water passes through the heater and back to the pool. A pool heating system must be electrically interlocked with the filtration pump, to ensure it only operates when the pump is working.

Some difficulties may be experienced when starting up the pump for the first time. The following procedure is suggested:

- Make sure the pool is filled with water to a level across the middle of the skimmer mouth.
- Close the skimmer and main drain lines by moving the handle on both valves to the closed position.
- Set the lever on the multiport to waste.
- Remove the top of the pump coarse strainer, fill with water and replace top firmly.
- Switch on the pump and immediately open valve nearest to the skimmer line. After a minute or two the pump should start pumping and the pressure gauge will rise. If this does not happen within three minutes, switch off and repeat the procedure. When the filter is operating satisfactorily with one line open, the second line (main drain) should be opened very slowly. If the pressure gauge immediately drops to zero, close the main drain valve. When the pressure has risen to normal, very slowly open again, keeping the pressure gauge reading constant. The pump will now suck from both the skimmer and main drain. The pump is now primed, stop it as the water is going to waste. Now follow the backwashing instructions opposite.

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It is necessary to initially clean the new media in the filter which, although graded, contains some dirt and small particles. These need to be backwashed to prevent them finding their way into the pool. When both suction lines are operating, turn off the pump and turn the multiport handle to backwash position. Turn on the pump, the water is now passing into the base of the filter and up through the filter media, forcing all dirt and fine particles to the top of the filter and to waste. Run the filter in this position for approximately three minutes, by which time the backwash water should be clean. Stop the pump, move the multiport lever to rinse position and run for 30 seconds. Stop the pump and move the lever to filter position. The filter can now continue to operate in this position. Never move the multiport valve without switching off the pump.

Note: Remember to top up the pool to replace the water you have lost during backwashing.

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## **Stainless Steel Pool Steps**

The steps for a Swimmer pool are designed to be supported by the pool coping and do not come into contact with the wall inside the pool, as this could cause damage to the liner. They are anchored into the surround paving with pinch anchors, which are set into concrete. These anchors have a screw which can be loosened for removing the steps in winter. The escutcheon plates, which cover up the pinch anchors, have to be cut with a hacksaw to fit around the stainless steel tube.

## **Paving**

The surround paving must have a slight fall away from the copings so any dust and dirt will not get washed into the pool. The surround areas should be made level with stone chippings and consolidated. The paving slabs can then be bedded on mortar. If, however, the paving has to be on made-up ground, it is sensible to lay the paving temporarily on sand and re-lay them after the ground has settled.

## Joining ABS Pipes and Fittings/Threaded Joints

Use the silicone sealants provided to make threaded connections to fittings.

### Glued Joints

Always observe the correct joining procedure as detailed below:

- Only use the glue supplied.
- Cut pipes square and remove all internal burrs.
- Using a file chamfer the outer edge of the pipe to facilitate entry into the fitting. Remove any burrs.
- Use a piece of clean rag and MEK cleaner to degrease pipe and pipe fitting surfaces.
- Brush a coat of glue on to the fitting and the pipe in a lengthwise direction. The glue should be applied sparingly to the fitting and more generously to the pipe.
- Immediately push the pipe and fitting together. Do not twist or turn the pipe around in the fitting other than to ensure its correct alignment. Hold in position for a few seconds and wipe away any surplus cement.
- Leave the joint undisturbed for at least 5 minutes then handle with reasonable care.
- The joint will not reach its full strength for 24 hours but it will be firmly set after 1 hour.

You may require to support pipes in the plant room using saddle clips at 1m intervals.

Every pool kit includes a full maintenance pack and a copy of The Swimmer Pool and Spa Treatment Guide. This booklets will enable you to understand the procedures required to maintain your pool water in perfect condition. our pool requirements will vary dependant on the season. Please consult your pool supplier for information.

For your safety reasons:

- Never allow young children or non-swimmers to use the pool unsupervised.
- Never empty the pool without first contacting your pool supplier.
- Never close the valves with the pump working.
- Never turn on the pump if there is no water in it.
- Never leave chlorine tablets in the skimmer basket in the winter, or put them directly in the pool.
- Keep all water treatment products in a cool dry place and out of reach of children

There are many products you can add to make life easier and more fun such as automatic pool covers, cleaners, sanitiser dosing systems as well as hot tubs, spas and saunas. All can be viewed at [www.goldenc.com](http://www.goldenc.com) where you can also identify a local supplier. Alternatively telephone 01271 378100 for their address.

Enjoy your pool.







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