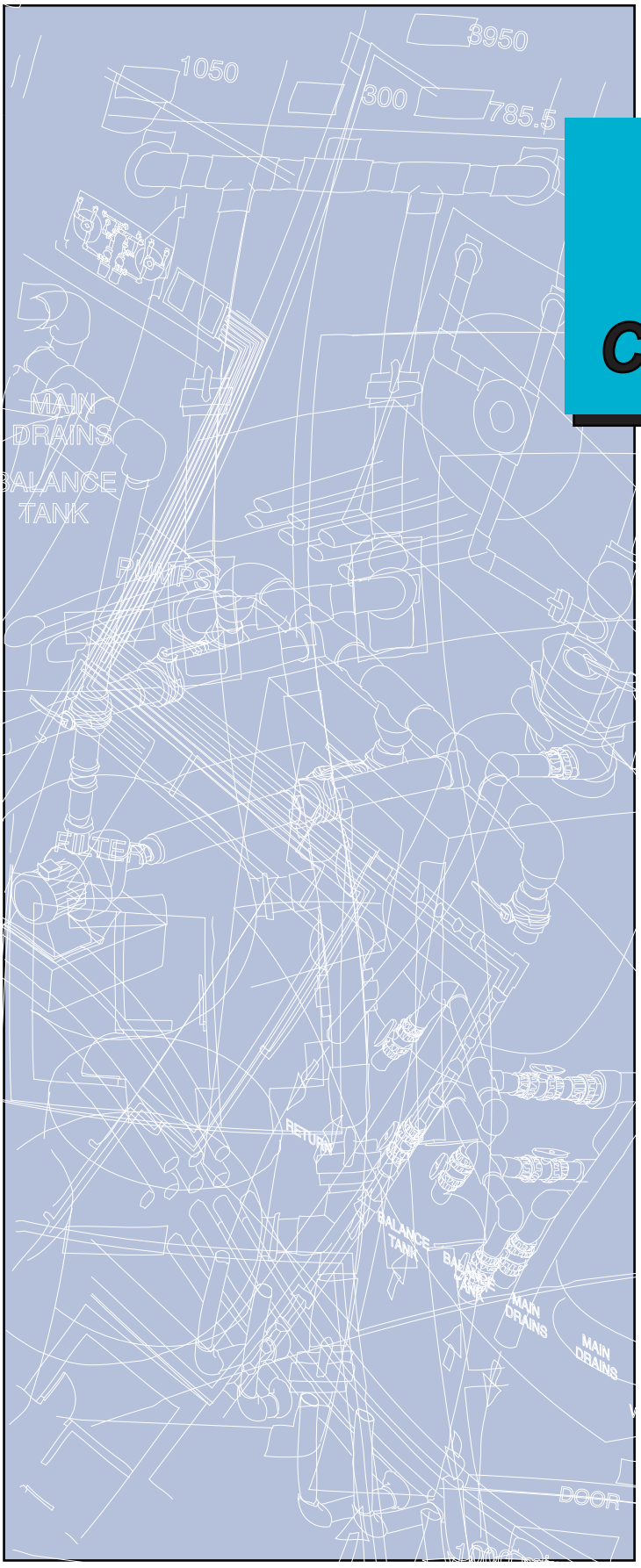


CONCRETE POOL CONSTRUCTION

Clearwater Swimming Pools

DESIGNSERVICE

CONTENTS

SECTION 1

STAGES IN POOL CONSTRUCTION

CONCRETE POOLS

The main advantage of a concrete pool is that it can be built to any shape to blend into any surroundings.

In the past many concrete pools were built which were not strong enough to withstand all the exceptional stresses and strains to which all pools are subjected. The usual reason for this was a lack of knowledge, and so this booklet has been written to set out the procedures that need to be followed to ensure the correct construction of a concrete swimming pool with a shallow end and a deep end hopper.

This type of pool can be built by any do-it-yourself enthusiast or local builder, ensuring the greatest strength, yet being economical in both materials and labour. The finished pool provides both a diving end and a shallower area for children. It has the same facilities as those of a conventional pool, but the gallonage of water is reduced, thus providing considerable savings on both chemicals and heating costs.

The maximum depth of pool to be no more than 2.3 metres

PLANNING PERMISSION

The majority of Authorities do not insist on planning permission for building a private swimming pool in your own back garden. However, Planning Authorities do have certain restrictions and you should always check these out first. If you are contemplating erecting an enclosure you are advised to check this with the local Authority.

LOCATION OF POOL

The following points should be considered.

1. The filter will require housing and a filter house should be constructed 3 metres from the pool and on the same level (see plumbing layout Section 2 page 10).
2. Services will have to be brought to the filter house, including the correct electricity supply (seek advice from a qualified electrician). Water supply will be needed to fill the pool, and an automatic water top up could be considered (see technical drawing Section 2 page 6).
3. Backwashing will be required into a drain or soakaway.
4. Pool Sizes

IMPERIAL		
20 x 10	30 x 14	40 x 20
24 x 12	32 x 16	
28 x 14	38 x 16	

METRIC		
6.10 x 3.05	9.14 x 4.27	12.2 x 6.1
7.32 x 3.66	9.75 x 4.88	
8.53 x 4.27	11.58 x 4.88	

EXCAVATION

Before contemplating building a swimming pool it is always advisable to dig a trial hole, and to seek advice from a Structural Engineer on the design of the poolshell to suit the ground conditions. All pools should have a ground bearing of 100Kn/m2.

Whatever the size and shape of pool, all of the excavation details are similar. The easiest method of digging is with a 360 tracked excavator.

Points to be considered.

1. It easier to dig from the deep end to the shallow end.
2. A means of access for the digger is vital - you do not want to get the digger stuck and not be able to remove it from the site (it can become an expensive ornament!).
3. The hole needs to be dug deeper than the finished dimensions of the pool to allow for all the concrete, rejects, lean mix and pool finishes (see technical drawings Section 2).

4. The excavation of the pool should be shaped perfectly, but if any of the area is over dug it should be filled with dry lean concrete and then compacted.
5. The whole area of the pool should then be covered with 75mm of rejects.
6. The main drain and drainage system should be installed at this stage . Make sure the main drain pipe and drainage pipe is covered with lean mix concrete not rejects. (see main drain diagram Section 2 page 11)

DRAINAGE SYSTEM

Often when digging the deep end hopper, water will slowly seep into the excavation in this area. If this happens, you should excavate a 600mm x 600mm x 600mm deep pit. Purchase three rectangular manhole sections and fix these one on top of the other in the pit. The under pool drainage pit should then be filled and surrounded by reject shingle and a pipe led up through the shingle. A diaphragm pump can be hired and attached to the pipe. Make sure that the end of the pipe has a strainer on it to stop stones going back into the pump. Most water problems can then be kept in check (see under pool drainage system plan Section 2 page 11). However, if a large amount of water is met, you must seek advice from a de-watering specialist.

CONSTRUCTION

Once the rejects have been laid, a layer of lean mix concrete is laid over the entire pool area and should be well compacted. It will be shaped to your required pool dimensions (see drawing Section 2 page 2).

The steelwork is then laid on top of the lean mix, creating the shape that you require. The bottom layer is kept up by spacers (see drawings Section 2). The second layer is laid and is held apart from the first layer with deck chairs. The starter bars are now connected to the floor steel (see technical drawing Section 2 page 9).

Concreting

Once the steel is in place it is time to concrete. Have plenty of labour at hand as it is a must to concrete the pool floor in one day. The easiest method is to have the concrete delivered and pumped into position.

The concrete must be vibrated and then tamped into position. This tamping should be carried out as accurately as possible, as a good result will help you when applying the pool finishes/tiling. The purpose of vibrating concrete is to thoroughly agitate the mixture into a perfect dense structure with no possibilities of air spaces or air pockets.

The mix is 35RC concrete, and **if you are using a concrete pump, you must ask for a pump mix.**

Great care in tamping the concrete around the starter bars is essential - make sure any pipe ends and the main drain are taped over to stop any concrete from falling into them.

POOL FITTINGS

There are several fittings that must be built into the walls of the pool as work progresses. These will vary according to the size of the pool.

1. **Main Drain/Low Suction**
   The main drain is situated at the deep end of the pool (see drawing Section 2 page 11). This is connected to the low suction situated in the pool wall (see drawings Section 2 pages 10 and 11).

2. **Inlets**
   Two No. inlets are usually positioned at the shallow end of the pool and approximately 400mm down from the top of the pool.

3. **Surface Skimmer**
   Depending on the size of the pool, the surface skimmer is bedded into a bed of cement 1” down from the top of the wall. The skimmer projects 25mm in front of the pool wall to allow for tiling and rendering. Shuttering is placed around the back of the skimmer and the wall steelwork is continued around the skimmer. Some wooden shuttering is necessary (see drawing Section 2 page 8).

THE LID OF THE SKIMMER IS ADJUSTABLE.

Once the pool is rendered and tiled, the face plates can be screwed into position on the wall.

FITTINGS - OPTIONAL EXTRAS

1. **Vac Point**
   The vac point is positioned half way down the long side of the pool, 300mm down from the top of the pool (see drawing Section 2 page 7).

2. **Underwater Light**
   The underwater light is normally positioned in the deep end of the pool (see drawing Section 2 page 5). If two lights are required, position these in the side of the pool.

3. **Automatic water top up**
   The automatic top up unit is positioned closest to the pool filtration (see drawing Section 2 page 6).

MAKE SURE ALL OF THE FITTINGS ARE WELL COVERED UP WITH TAPE BEFORE CONCRETING.

BUILDING THE WALLS
All the walls are built using solid concrete blocks, leaving a cavity for the steelwork and vibrated concrete.
You can purchase the solid concrete blocks locally or use the CLEARWATER SPECIAL BLOCK (See drawings Section 2 pages 15 to 26 & SEPARATE PRICE LIST). Section 4 provides a pictorial guide.

Build the back wall first. Use wall ties to bridge the cavity and leave spaces out for the required filtration equipment. Great care must be taken to not drop any mortar down the cavity as this can weaken the wall.

Once the back wall is complete you can continue with the two layers of reinforced steel (see drawing Section 2 page 2)

The steelwork now completed, the front wall can be built incorporating all the necessary filtration fittings. Is it best to leave the blockwork wall to dry for at least 5 days.

Backfilling with pea shingle can now commence, this backfilling should only be taken up to the bottom of the pipes. The pipework should then be attached to the bottom of the skimmer and plumbed back to the filter house. The main drain should now also be connected and plumbed back to the filter house. Continue with the same method for the inlets. If a vacuum point or automatic top are to be fitted, these should be installed now. Any cables for the underwater lights should also be installed. Backfilling can then be completed.

CONCRETING THE CAVITY
Concreting the cavity should be carried out all on one day, so have plenty of labour on site.

The strongest part of the wall is the 200mm vibrated concrete between the two rows of blocks. Before the concreting is carried out, it is a policy to erect scaffolding to stabilise the internal wall. A 35RC concrete is used for in-filling the cavity; again, premix concrete should be used. Shovel this around the in-fill cavity. This concrete should then be vibrated down. **If a pump is to be used to infill the cavity, ask for a pump mix.**

CLEARWATER CAN NOW OFFER THEIR OWN DESIGN BLOCK. THIS BLOCK CAN BE LAID IN ONE OPERATION AND THERE IS NO NEED FOR SUPPORT. CONCRETING CAN BE CARRIED OUT ALMOST IMMEDIATELY (SEE DRAWINGS SECTION 2 PAGE 15 TO 26) AND SEPARATE PRICE LIST. SECTION 4 PROVIDES A PICTORIAL GUIDE.

COPINGS

The next operation is to render the entire pool, but first the copings must be cemented around so that the walls can be rendered up to them. Remember that the copings should protrude 25mm over the inside of the pool wall to allow for the rendering and mosaic, and they must be perfectly level - use a line and level - and take particular care to make the coping perfect as this is one of the most important operations of the pool construction.

If constructing an indoor swimming pool the copings are normally flat top (see separate price list) and with the fall back to the pool.

When setting copings around the pool, ensure that a full length is used to bridge the skimmers so that undue stress is not placed on the skimmer top. Coping stones can easily be cut with a carborundum disc.

It is advisable to slurry the top of the pool walls with an SBR bonding agent and also to slurry the back of the copings. The mortar used for laying the copings should also have SBR additive mixed in. The mortar bed between the top of the pool wall and the bottom of the copings should not exceed 15mm. If the gap is greater than this, then a sand and cement bed must be slurried on to the top of the pool using sharp sand and cement. Again, SBR should be incorportated into the slurry and the sand and cement mixture. The copings can now be laid on a tight bed using standard tile adhesive incorporating an SBR additive. Again, the sand and cement bed should be slurried using an SBR slurry prior to the tile adhesive and copings being laid.

INTERNAL FINISHES OF A SWIMMING POOL

The most important part of a swimming pool is the integrity of waterproof tanking. Whatever method you use, you should follow the manufacturer's recommendations. All right angles, corners of walls and where walls meet floors should have a radius of 150mm.

Clearwater offers specifications for the internal finishes of swimming pools. These are as follows:

A. Specification for Waterproofing System
B. Specification for Rendering after applying Waterproofing System
C. Specification for Floor Screeding after applying Waterproofing System
D. Specification for Rendering and Screeding directly onto Pool Shell without Waterproofing System.
E. Specification for Tiling

THESE SPECIFICATIONS ARE FOR ADVICE ONLY. A FULL SPECIFICATION FOR EACH CONTRACT WILL BE GIVEN.

The waterproof tanking system, is also hydrostatic-proof .

A. Specification for Waterproofing System

General Conditions of Issue

1. Walls and floor slab are assumed to be structurally sound and should have been completed at least 28 days previously.
2. The contract should not commence if water ingress is a problem and advice should be sought from Clearwater.

Preparation

Power wash the surface to remove loose materials and to ensure a high moisture content.
W.S. should be applied to a smooth surface and this is best achieved by applying a light (thin) modfied rendercoat as follows:

Bonding Coat

Brush apply a thin (1mm) bonding coat consisting of 1 part SBR Bonding Agent and 1 part water mixed with fresh

Portland cement to a yoghurt consistency.

Thin Rendercoat.
Whilst the bonding coat is still tacky, render up 6-8mm using 4 parts washed sand to 1 part Portland cement, gauged with 1 part SBR Bonding Agent to 4 parts water. If the bonding coat dries reapply. Leave overnight before tanking.

Waterproofing System.
In order for the chemical reaction to take place, W.S. must be applied to a damp surface. Failure to do so will result in a future breakdown of the system. Dry areas should be pre-wetted with water, as soon as possible, to assist this process.

1. Wet the areas to be treated with wash down water consisting of 9 parts water to 1 part SBR bonding agent twenty minutes before the application of W.S. The twenty minutes is an approximate time that will ensure that the inner surface is still wet, but without surface water. On warm days this time will be reduced and further pre-wetting with water will be necessary.

2. Mix W.S. Grey with SBR bonding agent diluted 2 parts bonding agent to 1 part water, until a plastic consistency is obtained. Approxmately 9 litres of gauging water will be required per 25Kg of W.S. Apply the W.S. using a block brush at a rate of 2Kg/m^2, overlapping the floor by 20cms.
   Note 1
   Do not mix more W.S. than can be applied in 20 minutes.
   Note 2
   Keep the washdown (9 parts water to 1 part SBR bonding agent) well away from the W.S. gauging.

3. At all horizontal joints, a 25mm angled fillet must be formed of Fillet Mortar (F.M.) mixed with water as gauging. For this application, the W.S. does not have to be allowed to dry - Fillet Mortar is designed to be applied to a damp surface, so it is only necessary for the W.S. to set up (approximately 1 hour).

   This fillet is recommended because it will not shrink or crack and it provides a sound base to the wall/floor joint. Where there is an existing fillet, this procedure may be omitted at the client's discretion.

4. The second Application of W.S. can be applied as soon as it is possible to brush on without dragging the first coat. This should be brushed on at right angles to the first coat.

   This is the preferred method of application. However, if the wall has started to dry out (6 hours approximately), then leave for a full 24 hours and damp the surface as per paragraph 1, before applying the second coat.

   This second coat is normally White W.S.

5. W.S. must not be re-wet before it has fully cured (24 hours). On completion of the walls, finish the floor with a single coat of W.S. Grey.
   Note 1
   The two coat system of 4Kg/m^2 must not exceed 5mm in total thickness. The bet way to ensure correct coverage is to check the weight of materials used against the area covered.
   Note 2
   All areas treated must be protected from strong sunlight, rain and frost for 24 hours after application.
   Note 3
   Never apply W.S. in conditions below +5 C over a 24 hour period. However, heating should never be used directly onto newly applied W.S.

6. Pipe Sealing
   W.S. should be butted up to any pipes and given a thin collar of Soveraign Pro-Stick 2000 when the system has fully cured. Beddeing a stainless steel capped flange will be aesthetically more acceptable and will provide long term protection against imbalance to chlorine.

B. Specification for Rendering after applying the Waterproofing System

Apply a bonding coat. This consists of 1 part SBR bonding agent to 1 part water, mixed with ordinary Portland cement to a thin yoghurt consistency. Brush on, render on and render up while this is still tacky, i.e. almost immediately. If it starts to dry off then re-treat. Do not apply render to a dry/cured bonding coat. Render up using 4 parts plastering sand to 1 part cement, gauged with 1 part SBR bonding agent to 4 parts water. Minimum thickness 8-10mm. Leave for a minimum of 14 days.

C. Specification for Floor Screeding after applying Waterproofing System

Specification for Floor Screed
Where a floor screed is to be laid, apply a bonding coat consisting of 1 part SBR bonding agent to 1 part water, mixed with ordinary Portland cement to a thin yoghurt consistency. Brush on, then lay the floor screed using 4 parts sharp washed sand to 1 part cement, incorporating 1 part SBR bonding agent to 4 parts water. Apply the screed while the bonding coat is still tacky. Typically the screed is a minimum of 25mm thick. Do not apply the screed to a dry or curing bonding coat.

Leave for a minimum of 14 days before tiling.

D. Specification for Rendering and Screeding Directly onto Pool Shell without Waterproof System

The pool shell should have been completed at least 4 weeks before rendering takes place.

Preparation
Thoroughly damp down using fresh, clean water.

Bonding Coat
Mix 1 part SBR bonding agent and 1 part water with fresh Portland cement, to a thin yoghurt consistency. Brush a thin (1mm) coat and apply backing render while this is still tacky, i.e. almost immediately

Backing Render
Use 4 parts washed sand to 1 part cement, gauged with 1 part SBR bonding agent to 4 parts water. Apply a 10-12mm coat and mechanically key. Leave for 24 hours.

Top Coat
The top coat should be the same ratio mix of sand to cement (4:1), but slightly thinner at 8-10mm, or slightly weaker (sand to cement 5:1). Surface render should be left with a wooden float finish. Leave for a minimum of 14 days before tiling begins.

Specification for Floor Screed
Where floor screed is to be laid, then use 4 parts sharp washed sand to 1 part cement, incorporating 1 part SBR bonding agent to 4 parts water. Brush apply a bonding coat first and lay screed, typically to 25mm, while bonding coat is still tacky. Leave for a minimum of 14 days before tiling begins.

E. Specification for Tiling

Clearwater have a full range of tiles for the internal surface of the swimming pool. Ezarri tiles require ordering and generally take 4 to 6 weeks to be delivered. Blueblend are in stock and can be delivered in 4 to 5 days.

Specification for Tiling onto Rendered Shell
The surface must be sound and free from oil, grease, dust or contaminants.

Prior to tiling, apply a bonding coat consisting of 1 part SBR bonding agent to 1 part water, mixed with ordinary Portland cement to a thin yoghurt consistency. Brush a thin (1mm) coat and apply adhesive whilst this is still tacky. Tile up using Sovereign Standard Tile Adhesive, gauged with 1 part SBR bonding agent mixed with 3 parts water. Use the solid bed method, i.e. leave no voids. Typical bed thickness is 3-4mm.

Ensure tiles are level and leave 3mm (minimum) 15mm (maximum) gap between tiles for grouting. If tiles bed down lower than intended, lift them and add more adhesive.

As each section of tiling is completed, remove any adhesive from the tile surface with a damp cloth.

Grouting should not take place until the adhesive has fully set. Use Sovereign Water Resistant Tile Grout gauged with SBR bonding agent to water (mixed at 1:3).

The pool should not be filled for at least 3 weeks following grouting.

POOL FILTRATION

All electrical connections should be carried out by a qualified electrician.

Principal of operation
Pool water is drawn from the surface skimmer and the main drain assembly to the circulating pump. Large debris is trapped by the basket in the skimmer body and the strainer basket in the pump priming chamber, before the water enters the top of the filter tank via the multiport valve. The water then passes through the sand media leaving smaller debris as it travels through. The under drain collector tubes have holes that allow water to escape, but these are not large enough for sand. The filtered water then flows back through the multiport valve and re-enters the pool through the return inlet fittings.
Eventually there will be a reduction in flow and increase in the pressure gauge reading, due to debris accumulating in the filter. The sand must then be backwashed by reversing the water flow and sending the water to waste.

The pressure sand filtration system is designed to give a filtration turnover of 8 hours or less and consists of a circulating pump, filter tank and multiport valve.

Points for consideration
The pool filtration plant must have a concrete slab cast and should be housed in a weatherproof structure.

Consider drainage requirements if the base is below ground and could be damaged by accidental flooding or by ground water seeping into the plant chamber.

Heating requirements will also determine the size of the filter house as well as the layout. If oil or gas are to be used as fuel, then flues and fresh air vents must be considered and the plant suitably arranged. Seek advice from your engineer.

Don’t forget to make the door to the filter house wide enough! This will allow for easy removal of equipment at a later date if required, without the need for dismantling.

Allow yourself enough room to carry out routine maintenance and general cleaning and servicing. This also means enough headroom!

Stages

1. Position the pump and filter tank. Lightly grease the 'O' ring with petroleum jelly and, making sure all debris is removed, fit the multiport valve assembly by screwing it home.

2. Using the two plastic ball valves provided, connect one to the main drain line and one to the skimmer line. Connect these two lines together with a tee piece, then, into the front of the pump on the suction side (this is called the dual valve assembly).

   The valves allow flow adjustment as well as isolation of the skimmer and main drain.

3. Extend a $1^{1}/_{2}$inch pipe from the delivery connection on top of the pump and plumb this into the 'pump' connection on the multiport valve. Make sure a socket union is incorporated.

4. Extend the return line back to the pool and connect to the 'return' line on the multiport valve. Again make sure a socket union is incorporated.

5. Isolating ball valves must be used if the filtration plant is installed below water level. The valve MUST be installed on the POOL SIDE of the socket union. This will safeguard against flooding if work has to be done on the filtration system.

6. Extend the backwash hose from the 'waste' connection on the multiport valve to a suitable discharge point.

Note: The socket unions which are fitted facilitate easy removal of a piece of equipment for maintenance or replacement.
When the filter tank is located in its final position the sand media can be introduced.

1. Undo all the socket unions surrounding the multiport valve.
2. Unscrew the valve and put to one side.
3. Check the 8 under drain collector tubes at the bottom of the tank for tightness and pour water into the tank until the tubes are covered to a minimum depth of 225mm (9in). This prevents damage to the tubes when the sand is added.
4. Using a funnel, pour the sand into the tank. Make sure the funnel is correctly located and that the vertical centre pipe is held in place by the funnels central hub.
5. Fill the tank two thirds full with sand and level off by hand.
6. Wash any sand off the multiport valve screw threads and off the tank valve opening.
7. Lubricate the 'O' ring with petroleum jelly.
8. Carefully replace the multiport valve and its pipework. Tighten by hand only.
9. Having made sure all the pipework lines up, reconnect the socket unions.

STARTING UP PROCEDURE

1. Make sure the pool is filled to the middle of the skimmer.
2. Close both valves, skimmer and main drain.
3. Set multiport valve to the rinse position. **Make sure the backwash is connected to a localised drain**.
4. Remove the top of the pump course strainer and fill to the top with water. Replace the top firmly.
5. Turn on the pump and open the main drain valve slowly. After a minute or two the pump should start pumping and the pressure gauge will rise. If this does not happen within 3 minutes, close the main drain valve, switch off and repeat the procedure.
6. When the filter is operating satisfactorily with one valve open, the second valve should be opened very slowly. If the pressure gauge immediately drops to zero, turn the skimmer valve off until the pressure has risen to normal, then slowly open the skimmer valve again.

7. When the pressure gauge is constant and both skimmer and main drain are open, run the pump for 4 or 5 minutes. Then switch off the pump.
8. Backwashing on start-up.

   With both skimmer and main drain valves open, and the multiport in the backwash position, the water is pumping into the base of the filter, forcing all the fine dirt and particles of sand out of the filter to waste. This is necessary to clean the new sand in the filter which although graded, has some dirt and small particles, which need to be backwashed to prevent these finding their way into the pool.

   Run the filter in this position for approximately 3 minutes, by which time the backwash water should be clean.

   Stop the pump, remove the multiport handle to the 'rinse' position and run for 30 seconds.

   Turn the pump off and move the multiport handle to the 'filter' position.

   The filter can now continue to operate in this position. This procedure above is only necessary for new installations or when the filter sand is changed.

NEVER MOVE THE MULTIPORT VALVE WITHOUT SWITCHING OFF THE PUMP. ALWAYS MAKE SURE THE POOL WATER IS AT THE MIDDLE OF THE SKIMMER.

References and Standards

Movement joints should be provided in accordance with BS5385 Part 1 and should be determined, where necessary, at the design stage.

1. Building Research Establishments Digest 104 "Floor Screed".
2. British Standard BS5980 1980 "Specification for adhesive for use with ceramic tiles and mosaics".
3. British Standard Code of Practice CP202 1972 " Tile Flooring and Slab Flooring".
4. British Ceramic Tile Council Floor Tile Laying Specification Nos. 1-3.
5. British Ceramic Tile Council Specification No.5 "Ceramic tiling in indoor swimming pools".

IF IN DOUBT, PLEASE ASK.

SECTION 2

BLOCK POOL
&
CW SPECIAL
BLOCK POOL

Poolshell

The following standard, codes and recommendations are useful reference:

BS8007 Design of concrete Structures for Retaining Aqueous Liquids
CP110 The structural use of concrete.
Cement & Concrete Association construction booklet Concrete Swimming Pools (ISBN 0 7210 1265 5)

Concrete Pools (freestanding and in-ground) build to 2.1 Construction Methods.

a) The specification shall be drawn in accordance with recognised Codes of Civil Engineering and Building Practice.

b) Design calculations and structural drawings shall be prepared by a qualified structural engineer.

c) All works shall be supervised and carried out by the contractor in accordance with recognised good civil engineering and building practice.

d) Recommendations as far as design, workmanship and materials of the appropriate British Standards Institution's Code of Practice 32 shall be observed at all times.

e) All pools shall conform to the following:

i) In-ground poolshells shall be designed and constructed to meet the internal and external water pressures, as well as withstand soil forces from additional structures or separate foundations which may be imposed upon them. Provision shall be made for hydrostatic forces (subsoil water pressure) whether by underfloor and general drainage, hydrostatic relief valve, mass concrete, poolside sump well or a combination of all or some of these methods.

ii) Design provision shall help protect the poolshell, fixtures and fitting against frost; it must be appreciated correct winterising procedure will properly prevent frost damage. The contractor should instruct the client as to the method of winterisation he recommends for his type of pool.

iii) Free-standing pools shall be designed and constructed to withstand internal forces placed upon the shell.

f) All poolshells shall have an adequate underpool drainage system constructed, irrespective of soil conditions at the time of excavation.

g) Poolshells must not be sited where damage to the footing of existing buildings could occur; nor must they be located near to any trees where roots might disturb the structure.

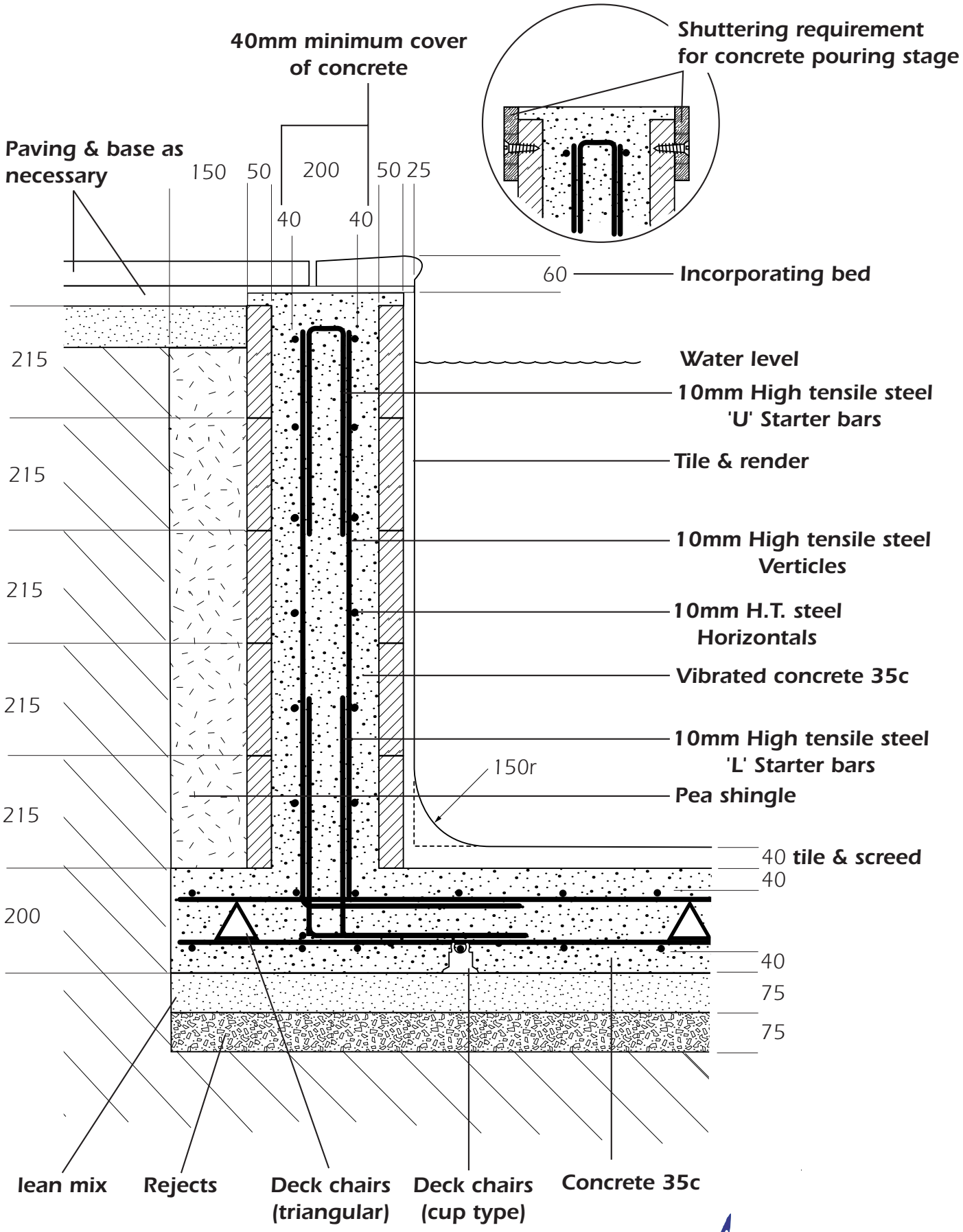
h) Excavations shall be carried out to a high degree of accuracy with hand trimming as necessary.

I) Areas of overdig shall be brought back to correct levels using dry lean concrete to avoid possible subsidence.

j) All pool fittings (skimmers, inlets, outlets, underwater lights, etc.) shall be installed in accordance with manufacturers' instructions. All pipework must be installed, and secured against possible movement so that settlement cannot take place.

k) Backfilling must be carried out with 25mm down rejects, or fine pea gravel or similar, to provide free draining backfill with no possibility of settlement.

CW SPECIAL BLOCK POOL - STRUCTURE



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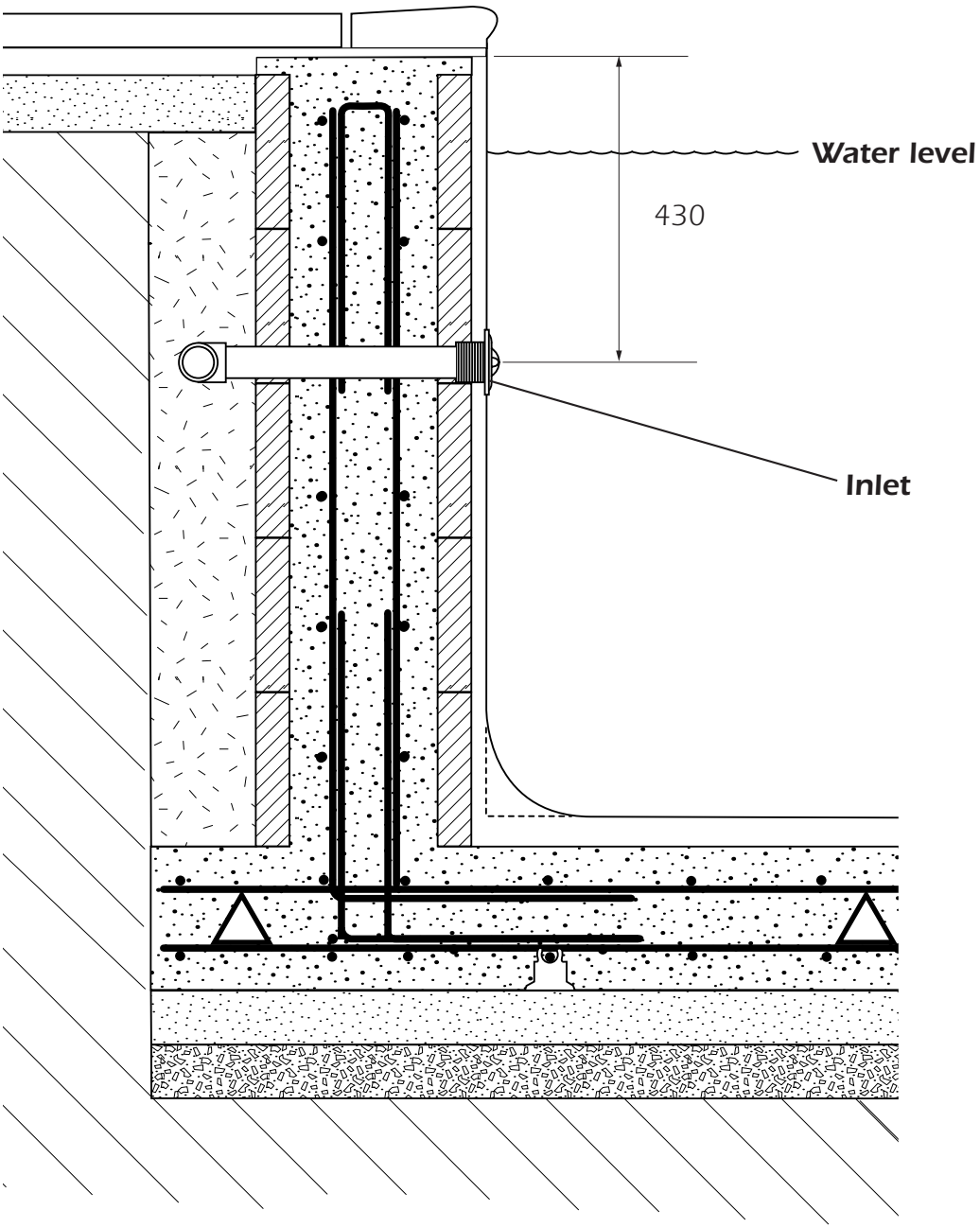
DESIGNSERVICE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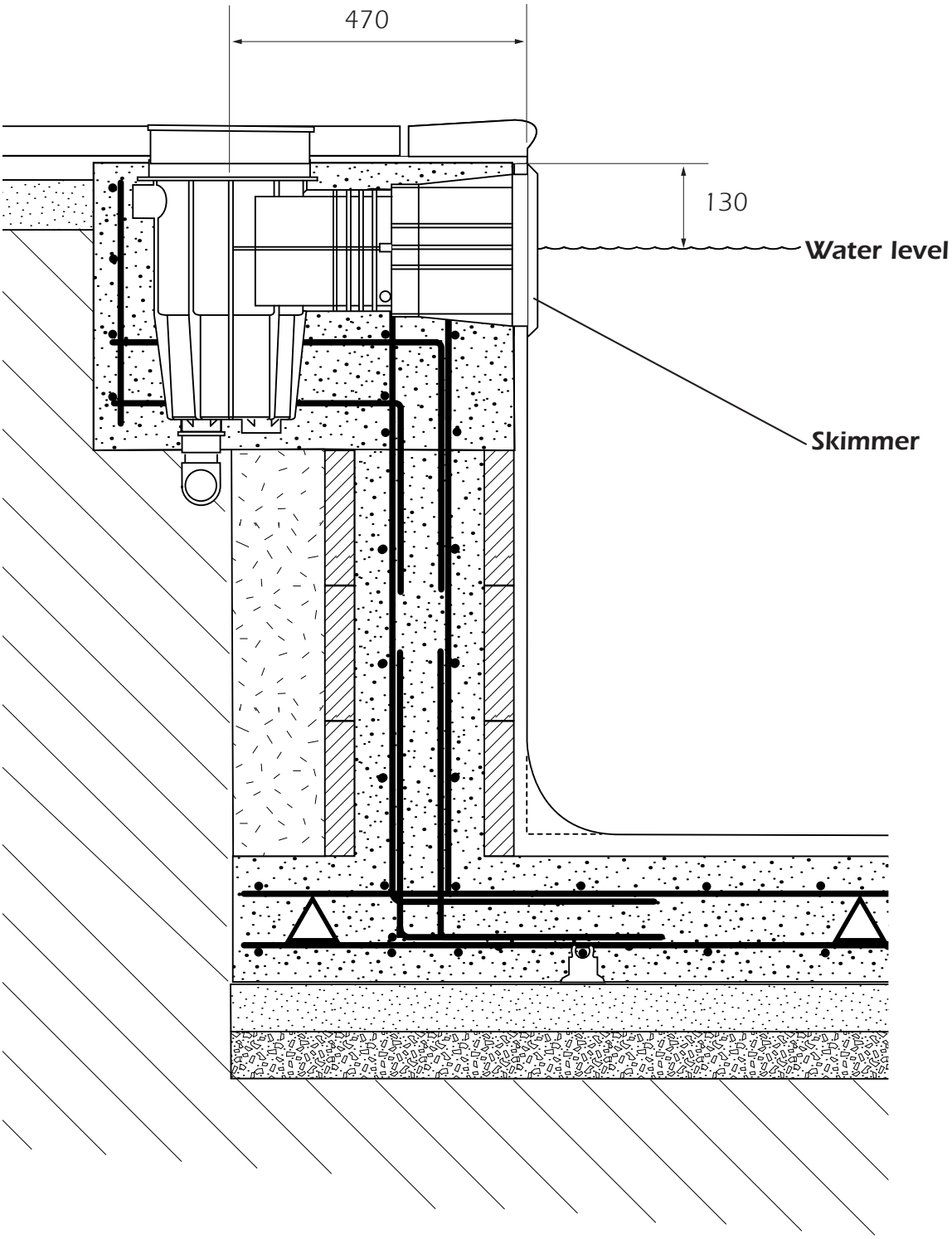
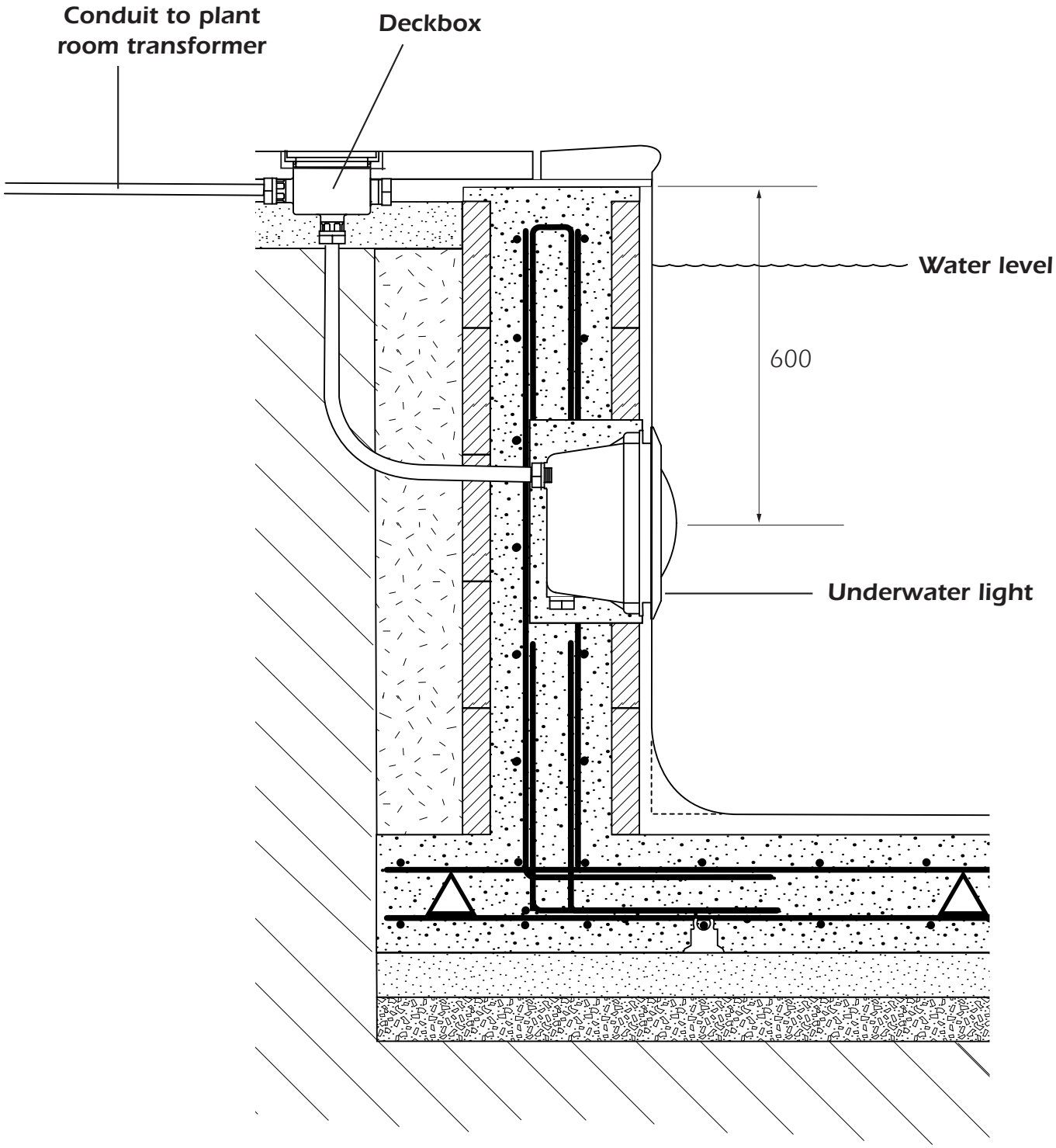
Inlet

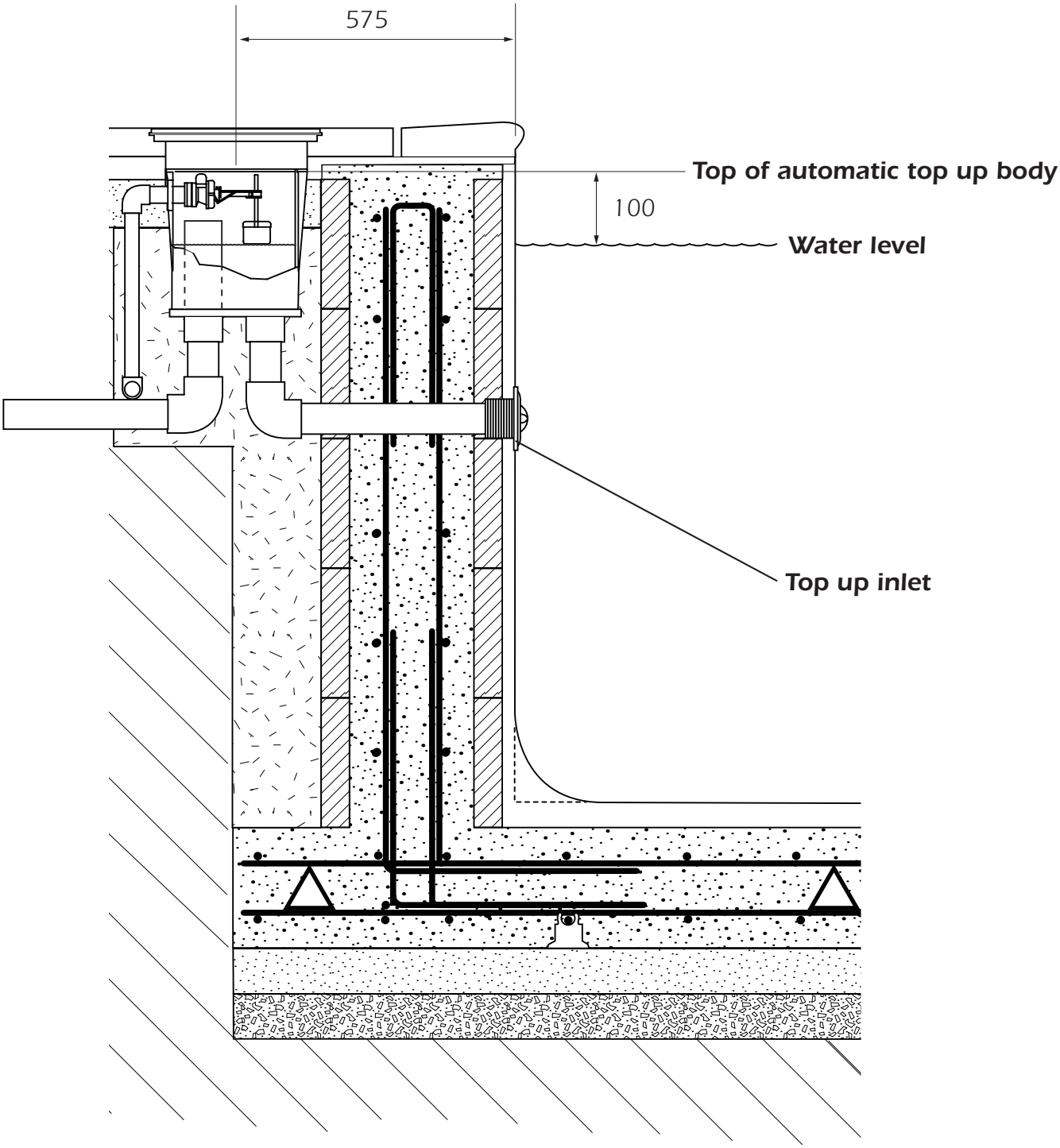

470
130
Water level
Skimmer

OPTIONAL


Conduit to plant room transformer
Deckbox
Water level
600
Underwater light

CW SPECIAL BLOCK POOL - TOP UP

OPTIONAL



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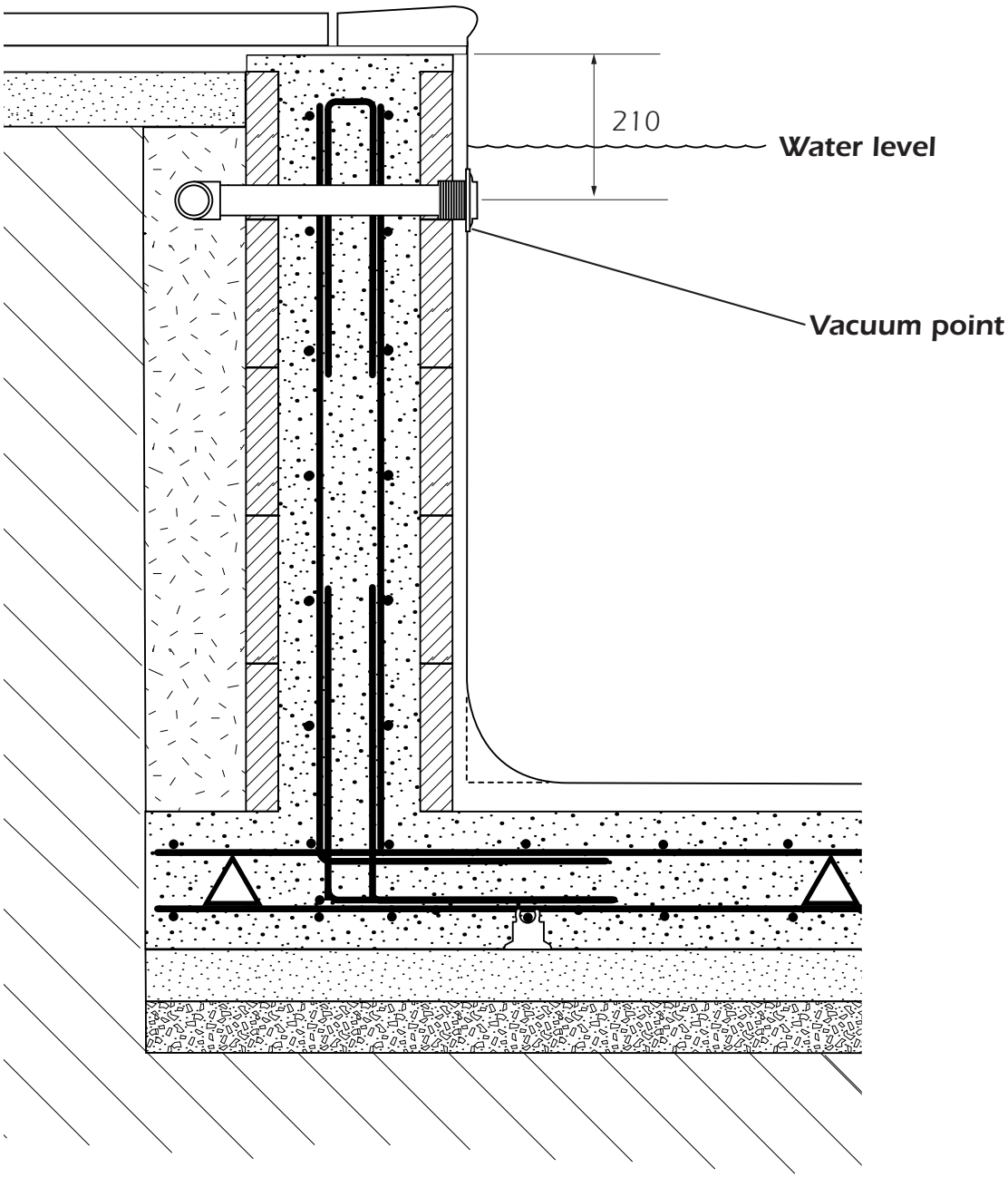
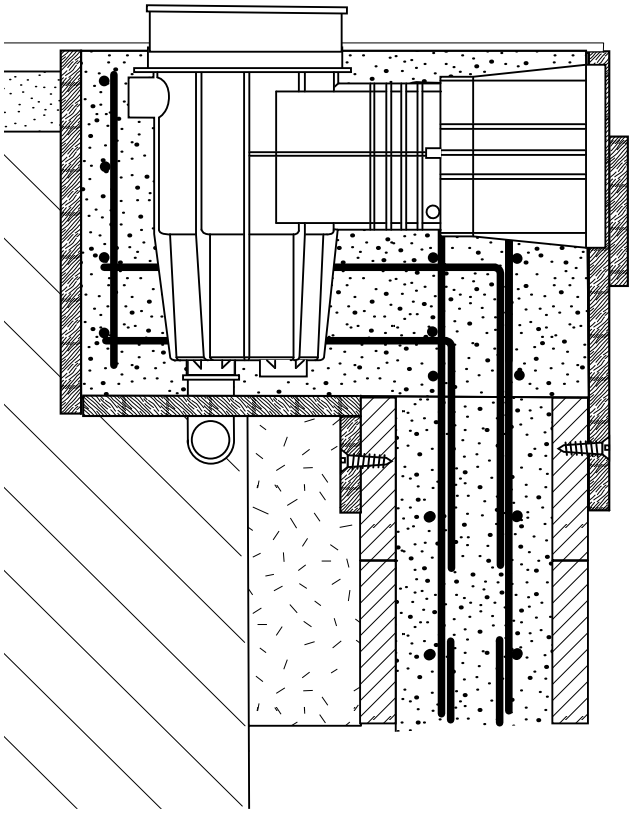
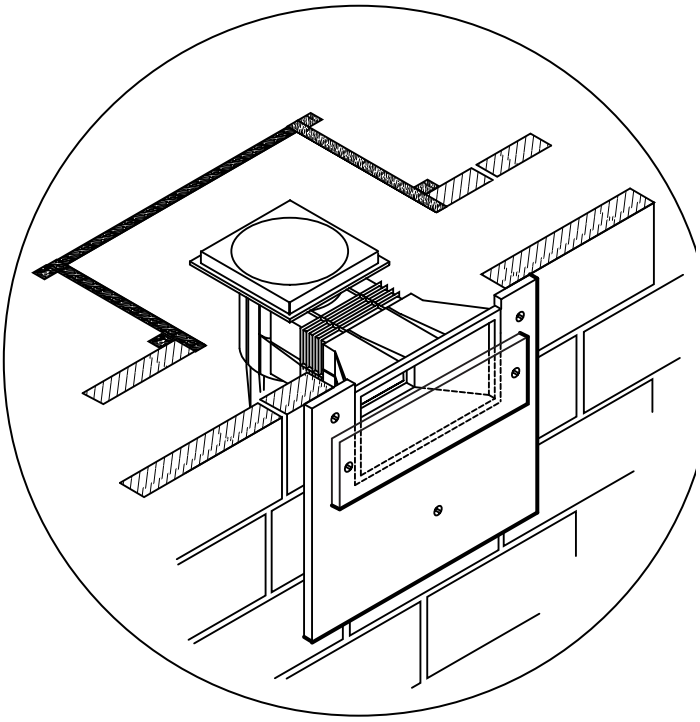
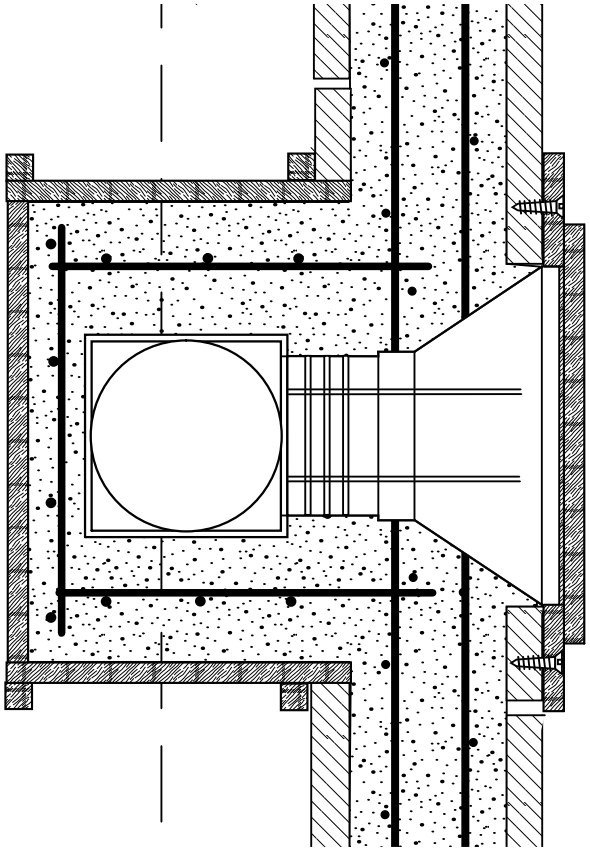
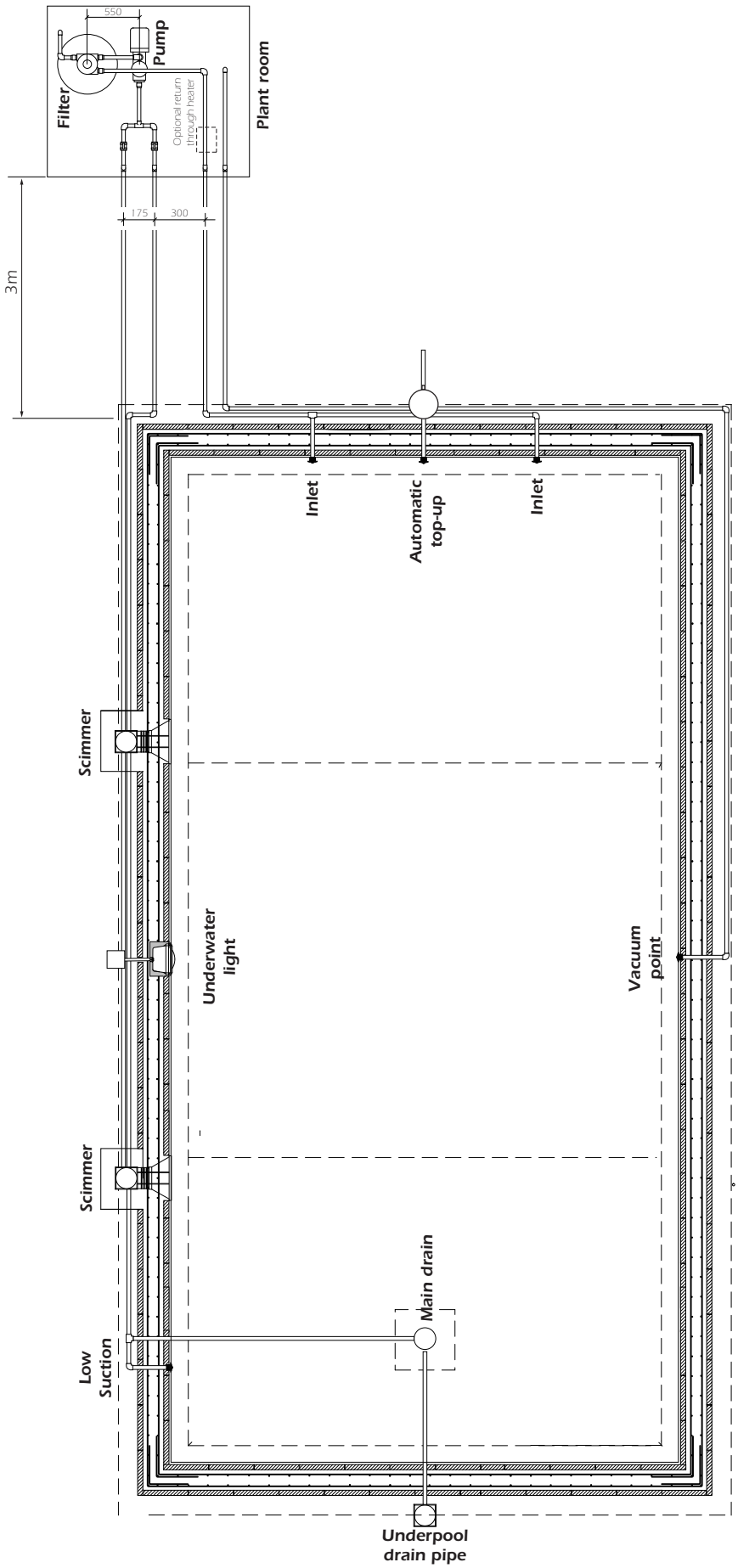




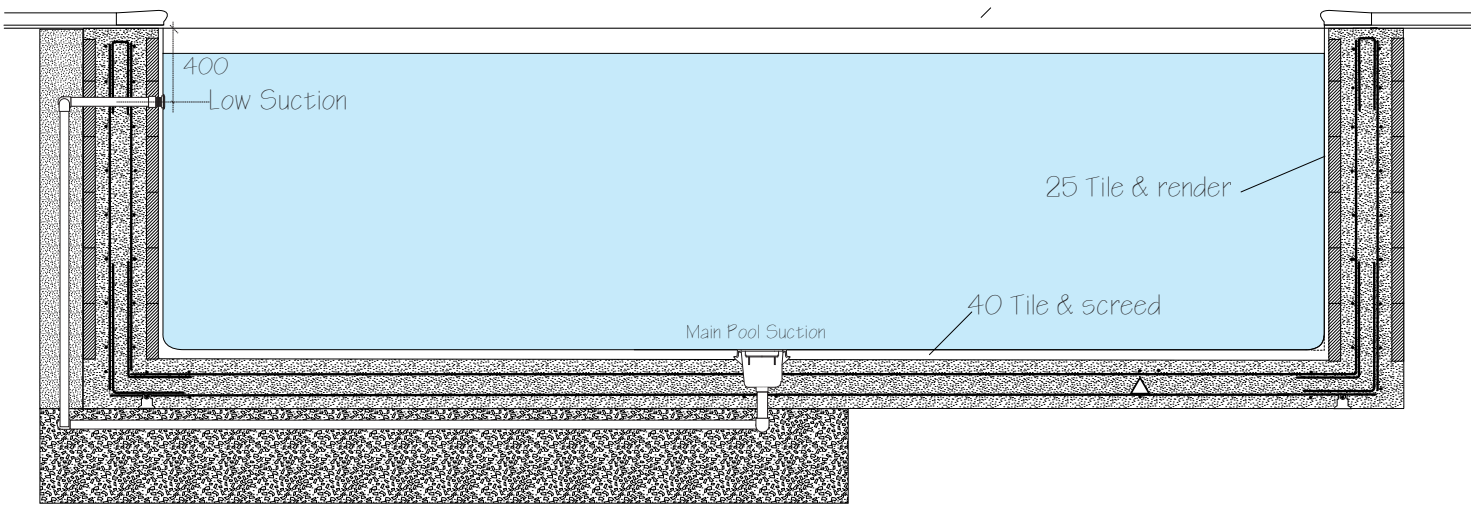


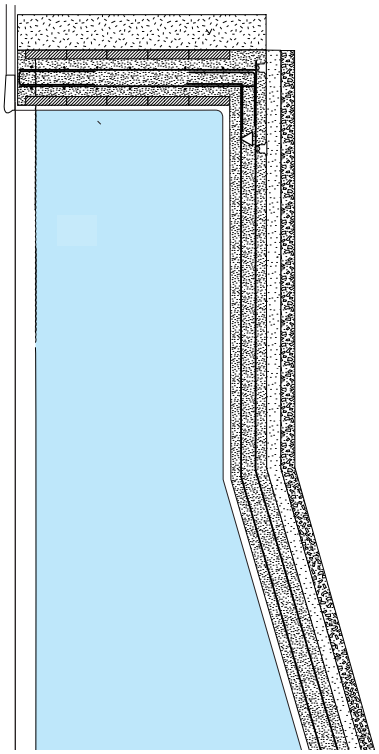


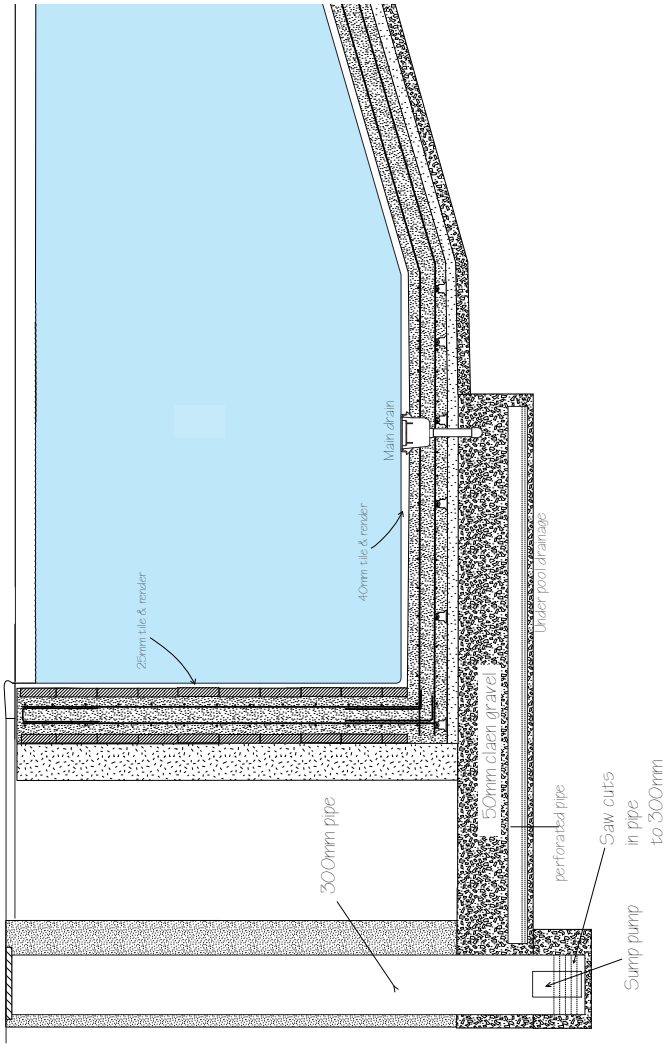
Shuttering requirement for concrete pouring stage


550
Pump
Filter
Optional return through heater
Plant room
175
300
3m
Inlet
Automatic top-up
Inlet
Scimmer
Underwater light
Vacuum point
Scimmer
Main drain
Low Suction
Underpool drain pipe

CW SPECIAL BLOCK POOL - STRUCTURE CROSS SECTION





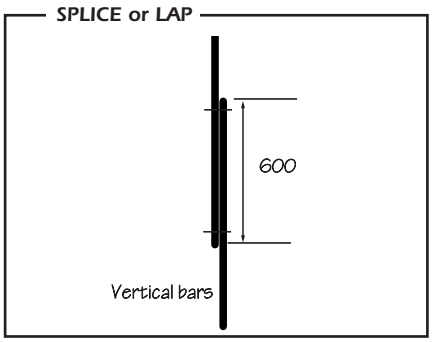

Main drain
40mm tile & render
25mm tile & render
Under pool drainage
150mm clean gravel
perforated pipe
Saw cuts
in pipe
to 300mm
300mm pipe
Sump pump

SECTION 3

STEEL REINFORCEMENT

REINFORCEMENT IN WALLS

The main reinforcements In the walls of swimming pools are the vertical bars. These do the work, the horizontal bars hold them in place and help to spread the load between the verticals. The bars must be continuous to be fully working, but practically it is not always possible to do this, so the bars have to be spliced. The splice is formed by overlapping the two bars to form a continuous bar (see Illustration 1). The length of the overlap is critical and to avoid confusion for the non-experienced person, the lap should be 60 times the diameter for vertical bars and 50 times the diameter for horizontal bars.



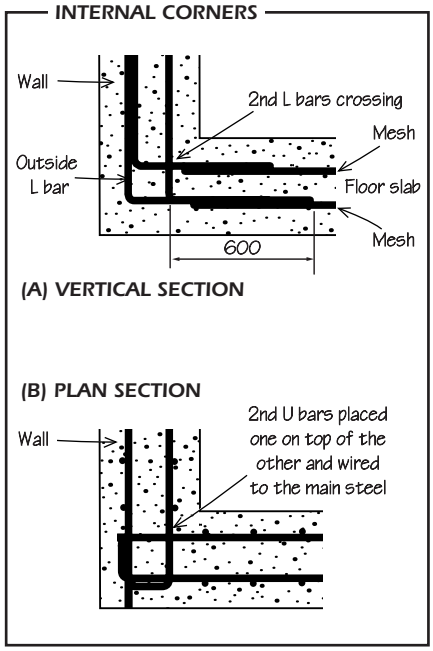


Illustration 2

Concrete is vulnerable to cracking at internal corners of the walls and where the wall meets the floor slab. Therefore it is recommended that bars should cross each other at these points (see Illustration 2 - Vertical and Horizontal Sections). All the reinforcing bars need protecting, therefore there should be a minimum of 40 mm of concrete outside the reinforcing bar.

Reinforcing can be achieved by individual bars being tied together by wire at the intersections or by bars in sheet form called mesh. Mesh is normally used in the floor slab. By using square mesh (i.e. the same bars running in both directions at the same centres) this can be placed either way. A sheet of mesh is rectangular and is placed in floor slabs. It is not subjected to the same loads as in the walls, therefore the overlap of mesh is standard at 400mm (see Illustration 3)

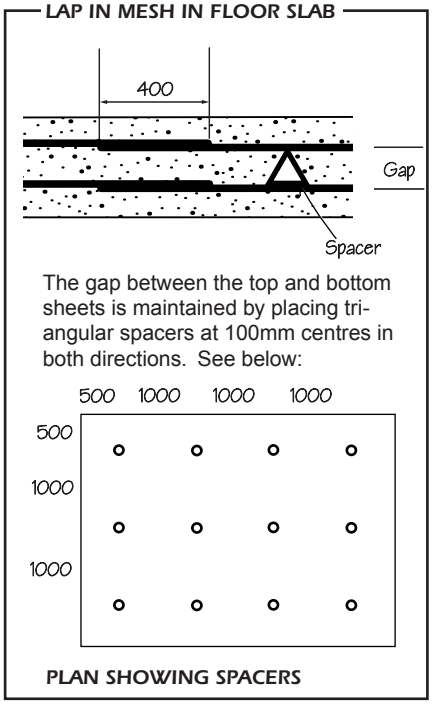


Illustration 3

STEEL REINFORCEMENT IN WALLS

The reinforcement is ordered from what is called a bending schedule.

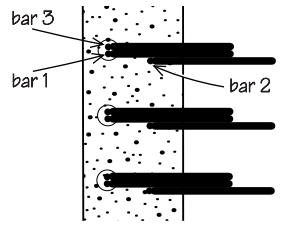
Bending by the Supplier is done to this list and the bends are listed on the schedule with a bar code. Each bar is given a number, which is shown on the drawing.

The steel to be used is denoted thus:
(i) High Tensile Steel is denoted “T” on the schedule
(ii) Mild Steel is denoted “R” n the schedule

Bending: There are basically only 3 types of bars in swimming pool slabs and walls. They are:

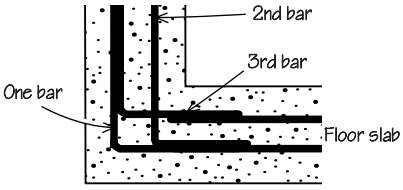
(1) Straight Bar		code 20
(2) ‘L’ bars	L	code 37
(3) ‘U’ bars	U	code 38

STARTER BARS FROM FLOOR SLAB INTO WALL



SECTION

PLAN



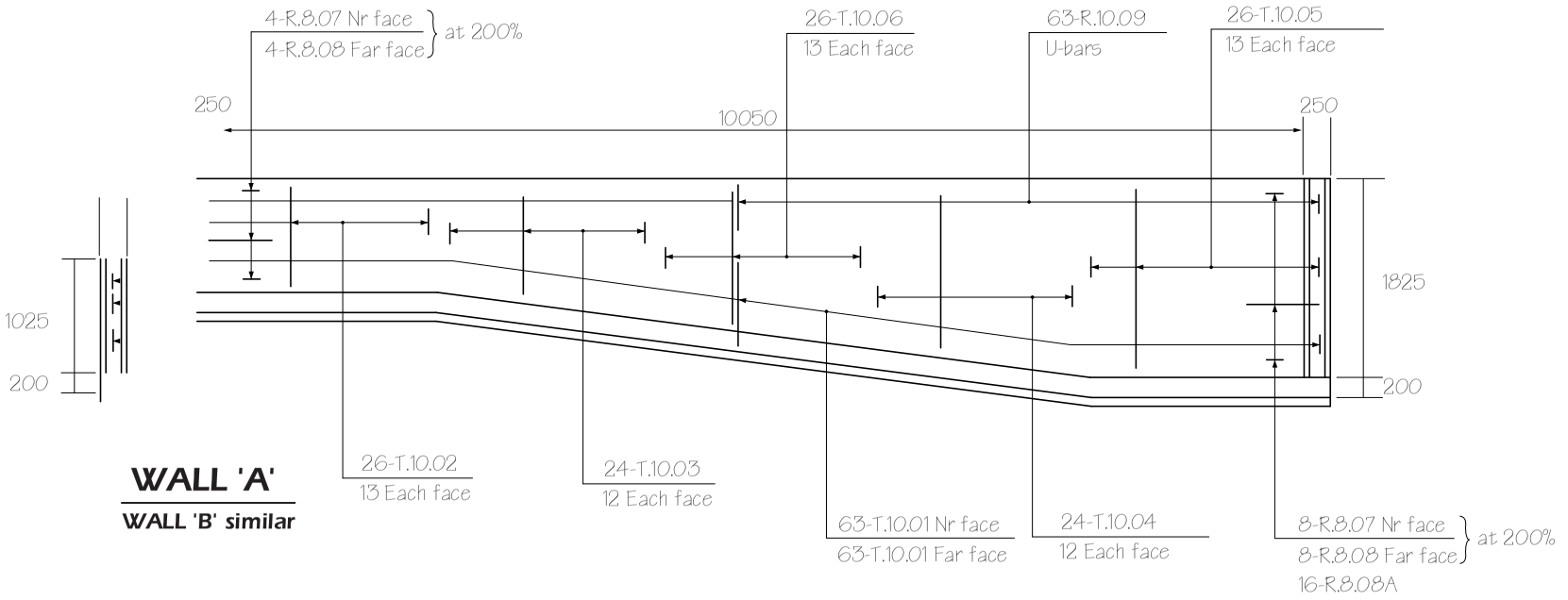
BAR NOTATION ON DRAWING AND SCHEDULE

eg. 10. T10. 01. 100

- Indicates number of bars required
- Indicates high tensile steel
- Indicates diameter of bar
- Indicates the number allocated to that bar
- Indicates the centres in millumeters of the bars

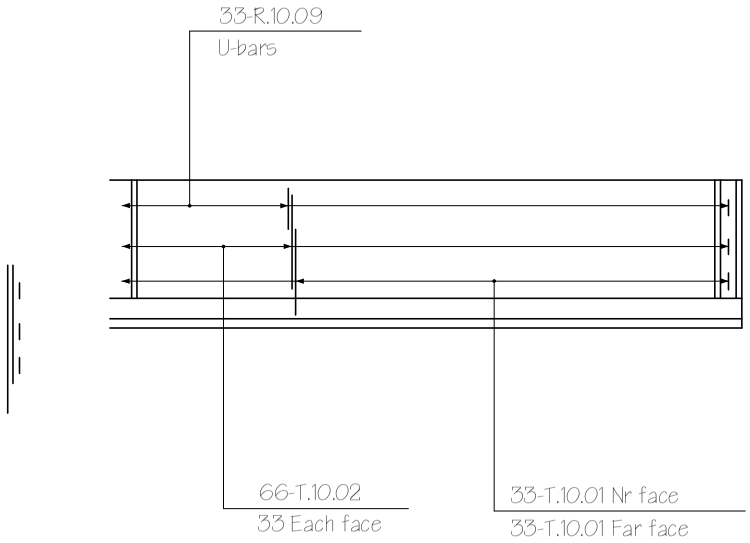
BENDING SCHEDULE

	Mk	Size	No. per Item	No. of Items	Total	Length	Shape Code	A	B	C	D	E/R
Wall	01	T10	63.63.63 33.33.33	2	576	1500	37	750				
	02	T10	26.66.26	1	118	900	20					
	03	T10	24	2	48	1000	20					
	04	T10	24	2	48	1450	20					
	05	T10	26.26.66	1	118	1700	20					
	06	T10	26.26	1	52	1350	20					
	07	R8	8.4.	2	24	900	37	450				
	08	R8	8.4.	2	24	1200	37	600				
	08A	R8	8.8.4.4	2	48	1050	37	600				
	09	R10	63.33	2	192	1100	38	450	200			
	10	R8			48	6000	20					

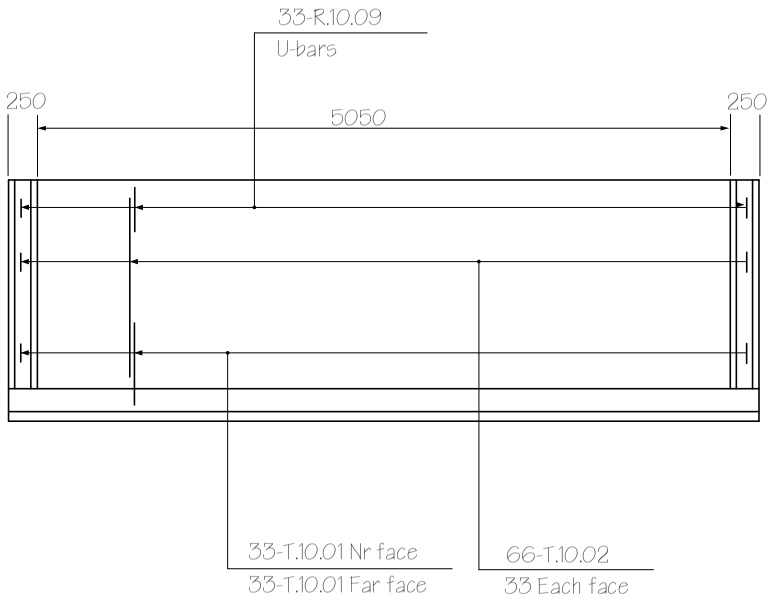


WALL 'A'

WALL 'B' similar



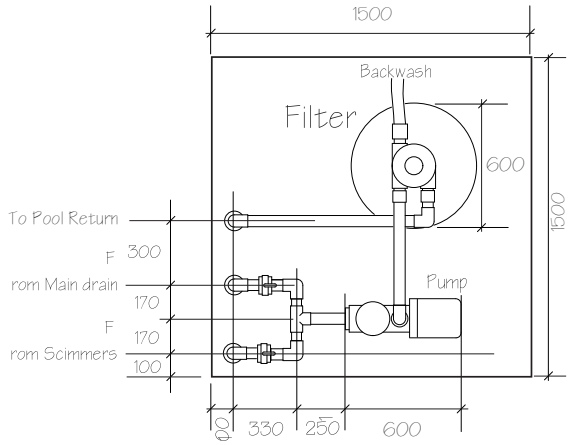
WALL 'C'



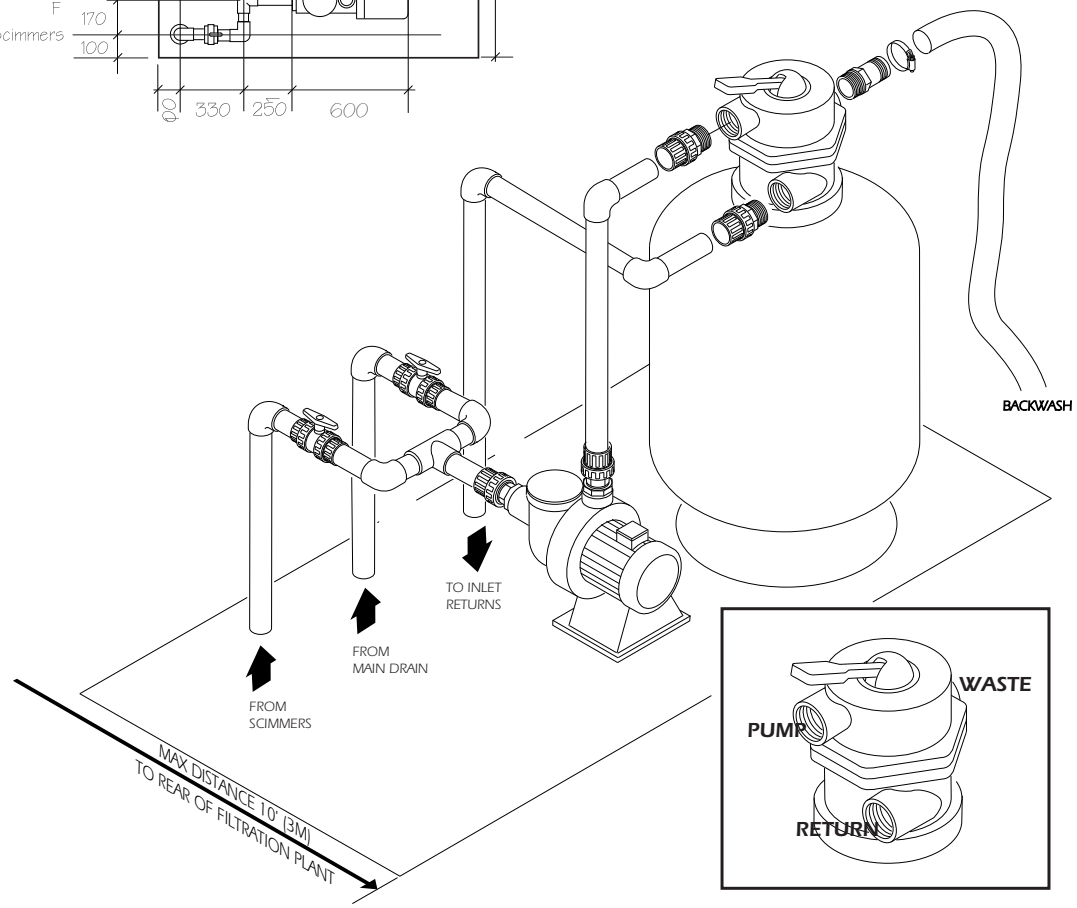
WALL 'D'

SECTION 4

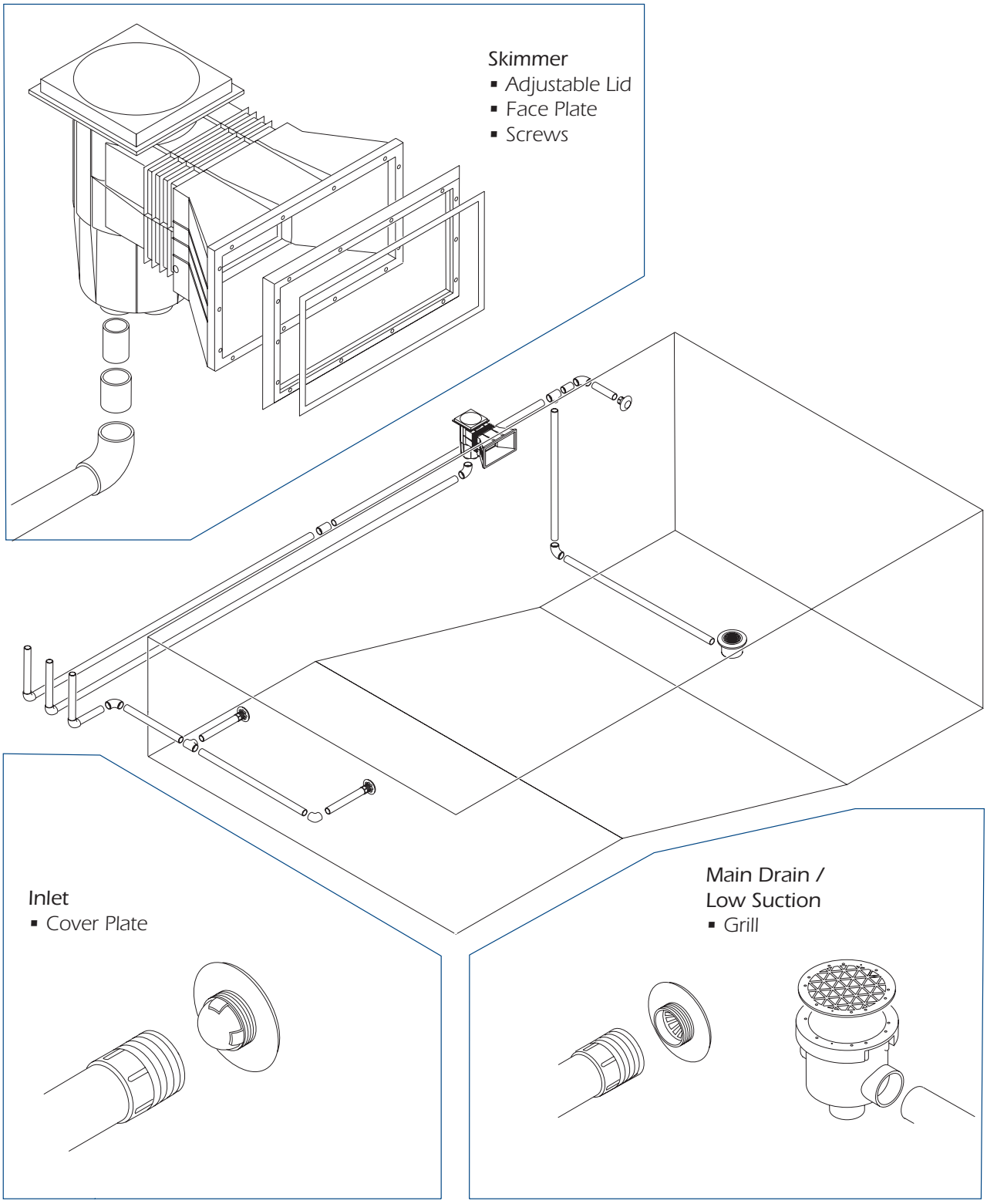
PARTS LIST

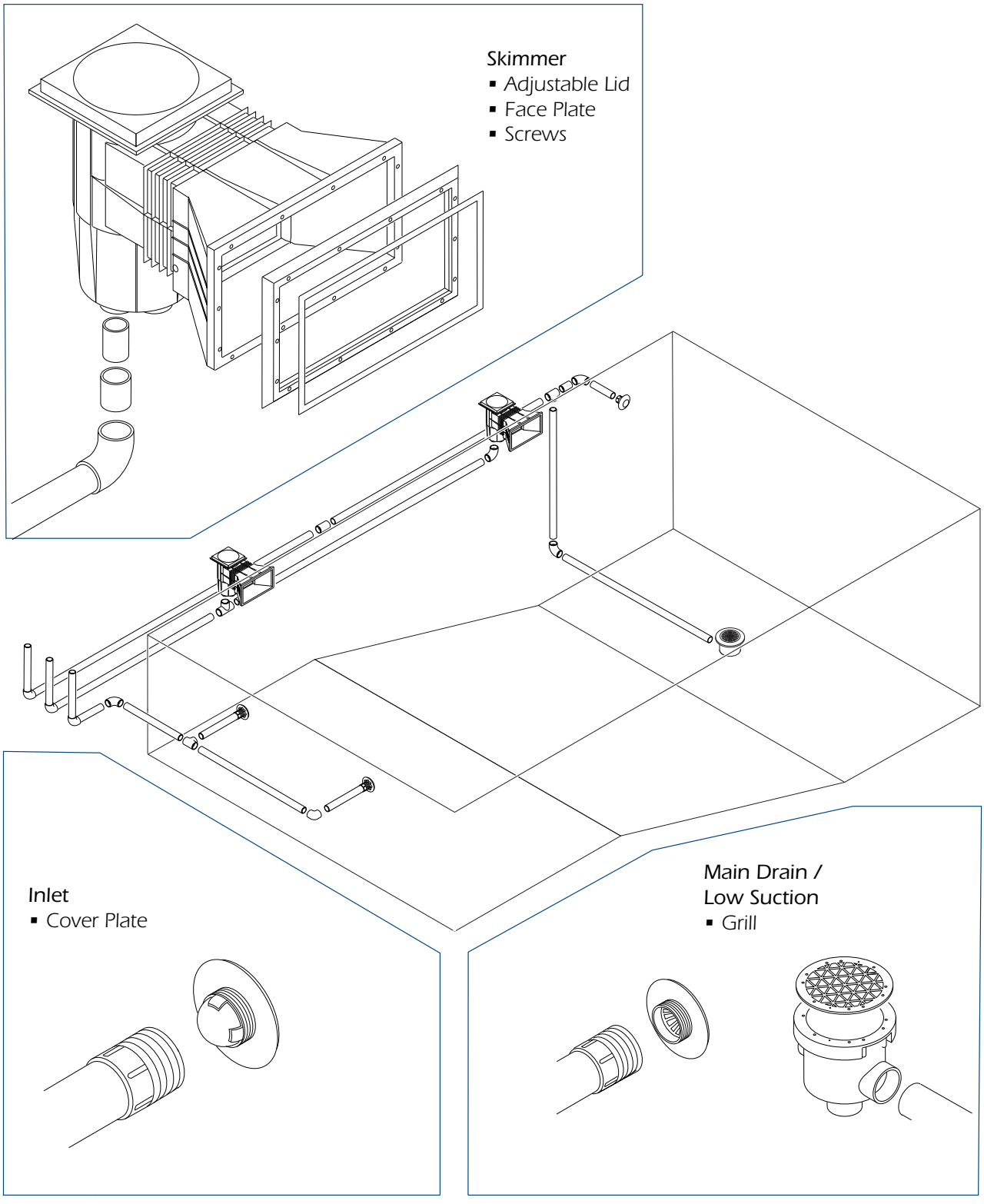


BEFORE FITTING PUMPS SEE
AMENDMENT AT REAR OF
BOOK FOR IMPORTANT INFORMATION



WHEN PLUMBING THE MULTI PORT
YOU WILL FIND EACH PORT MARKED
PUMP - RETURN - WASTE
PLEASE PLUMB UP CORRECTLY TO
POOL OR HEATER


Skimmer
▪ Adjustable Lid
▪ Face Plate
▪ Screws
Inlet
▪ Cover Plate
Main Drain /
Low Suction
▪ Grill


Skimmer
▪ Adjustable Lid
▪ Face Plate
▪ Screws
Inlet
▪ Cover Plate
Main Drain /
Low Suction
▪ Grill

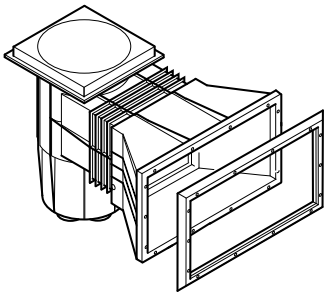
Pack 'A'

Part No.	Description	20'x10'	24'x12'	28'x14'	30'x14'	32'x16'	38'x16'	40'x20'
1	Wide Angle Concrete Skimmer	1	1	1	1	2	2	2
2	Concrete Main Drain	1	1	1	1	1	1	1
3	Low Suction	1	1	1	1	1	1	1
4	Concrete Inlet with Socket Nipple	2	2	2	2	2	2	2
5	90 Elbow	20	20	20	20	22	22	22
6	45 Elbow	4	4	4	4	4	4	4
7	1.5" Tee	3	3	3	3	4	4	4
8	1.5" ABS P/T Nipple	2	2	2	2	2	2	2
9	1.5" P/P Socket	10	10	10	10	10	10	10
10	Roll PTFE Tape	1	1	1	1	1	2	2
11	250ml Glue	2	2	2	2	2	2	2
12	1.5" ABS Pipe(3 metre lengths)	12	12	15	15	19	19	19
13	Silicone Sealant	1	1	1	1	1	1	1

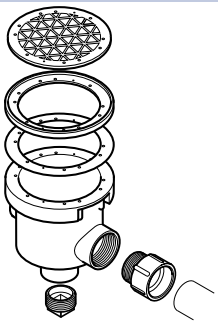
Pack 'B'

Part No.	Description	20'x10'	24'x12'	28'x14'	30'x14'	32'x16'	38'x16'	40'x20'
		1	1	N/A	N/A	N/A	N/A	N/A
14	0.5 hp Pump	N/A	N/A	1	1	N/A	N/A	N/A
14	0.75 hp Pump	N/A	N/A	N/A	N/A	1	1	1
14	1 hp Pump	1	1	N/A	N/A	N/A	N/A	N/A
15	Sand Filter 520dia	N/A	N/A	1	1	1	1	1
15	Sand Filter 650 dia	4	4	6	6	6	6	6
16	Filter sand (Bags)	5	5	5	5	5	5	5
17	P/T Socket Union	2	2	2	2	2	2	2
18	1.5" Double Union Ball Valve	1	1	1	1	1	1	1

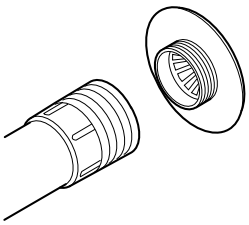
1 Wide Angle Skimmer



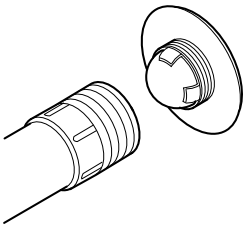
2 Main Drain - Low Suction



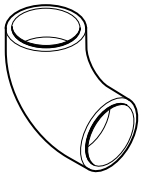
3 1.5"ABS P/T Nipple



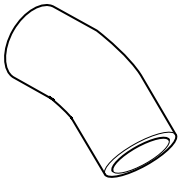
4 Inlet



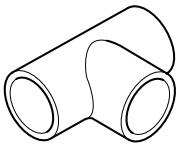
5 90 1.5"ABS Elbow



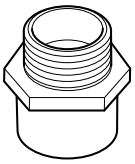
6 45 1.5"ABS Elbow



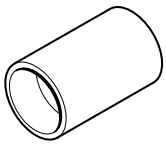
7 1.5"ABS Tee



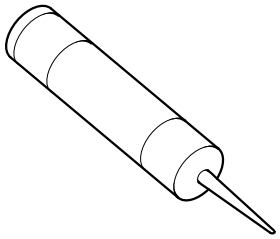
8 1.5"ABS P/T Nipple



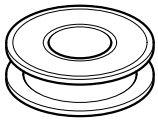
9 1.5"ABS P/P Socket



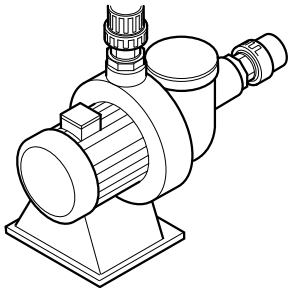
13 Silicone Sealant



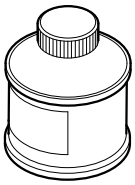
10 Roll PTFE Tape



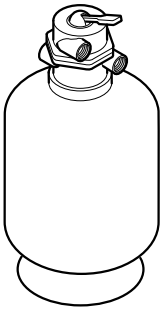
14 0.5 hp Self Priming Pump



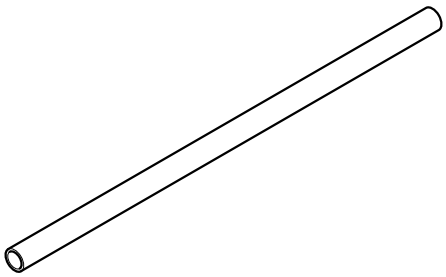
11 ABS/PVC Solvent Cement



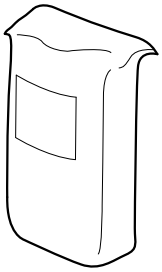
15 High Rate Sand Filter



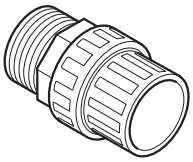
12 1.5"Class 'C' ABS Pipe



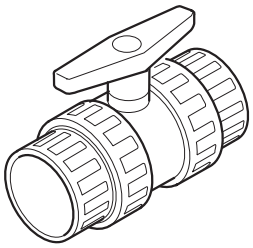
16 Bag Filter Sand



17 1.5" P/T ABS Socket Union



18 1.5" Double Union Ball Valve



IMPORTANT

INSTRUCTIONS FOR ELECTRIC CENTRIFUGAL PUMPS.

READ CAREFULLY BEFORE CONNECTING THE PUMP TO AN ELECTRIC SUPPLY, WORK MUST BE CARRIED OUT BY QUALIFIED PERSONNEL

1. Always refer to the manufacturers's instruction manual before operating the pump.
2. Check the pump data plate for correct voltage.
3. Make sure the pump is properly earthed.
4. Always use a motor protector/contactor set for the correct current (Amps) as indicated on the pump data plate.
5. To comply with regulations and for personal protection a 30mA R.C.D. should also be used.
6. Customers are advised to refer to the I.E.E. Wiring Regulations before connecting and running the pump.
7. On single phase pumps the rotation is pre-set
   On three phase pumps always check the rotation whenever the pump is connected to a new supply.
   Rotation is normally clockwise viewed along the pump towards the impeller. If the rotation is wrong, change two phase wires.
   Do not alter the earth wire (GREEN / YELLOW).
8. Never run the pump dry.
9. Ensure rotating parts are free to turn before starting the pump.
10. Always drain the pump after use in cold weather to prevent icing up.
11. Warranty is for workmanship and materials only.
    Stators are not covered by warranty unless a motor overload is used. The warranty period is one year from date of purchse.

UNDER-WATER LIGHT CONNECTIONS

The cable between the deck box and transformer should be suitably sized in accordance with current IEE Regulations. The size of cable used will differ depending on the type of cable used, the distance of the cable run and the installation method used.
The minimum size of cable used, regardless of distance should be 4mm and the minimum length should be 5m.
As a general guide, if using Steel Wire Armoured cable buried direct in the ground, 4mm will be suitable for lengths up to 20m and 6mm cable will be suitable up to lengths of 30m.
For distances in excess of 30m a qualified electrician should be consulted for the correct calculations of cable size to be used.
When the connections are made a voltage test should be taken to ensure there is 12v at the deck. If the voltage is under or over, the connections in the transformer can be altered onto different tapings to give the correct voltage.

Clearwater SWIMMING POOLS LTD

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www.clearwater-pools.co.uk