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BUILDING SYSTEMS

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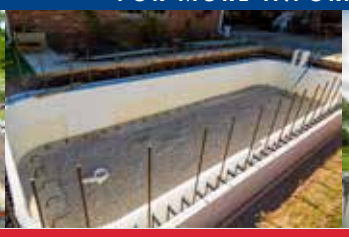


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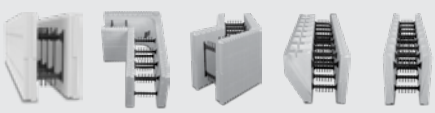
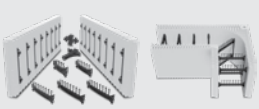
BUILDBLOCK BUILDING SYSTEMS

ICF SWIMMING POOL CONSTRUCTION MANUAL

REVISED AUGUST 2020


BUILDBLOCK ICF


BUILDRADIUS


BUILDLOCK KNOCKDOWN ICF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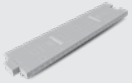
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BUILDBLOCK SWIMMING POOL CONSTRUCTION MANUAL

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BUILDBLOCK SWIMMING POOL CONSTRUCTION MANUAL

PREFACE

INTRODUCTION

This version of the installation manual was published in August 2020. Changes to this document, however, may occur without notice and users should contact BuildBlock Building Systems LLC, for the most current printed or downloadable version at buildblock.com. It is the purchaser's and/or contractor's responsibility to always use the most current and up-to-date version of the installation manual when installing BuildBlock forms and/or products.

This manual was designed to be used as a reference guide only. This manual is not intended to be used as a replacement or substitute for the actual training by an experienced and properly trained BuildBlock building professional. Before starting any project BuildBlock recommends that you receive proper training. BuildBlock also recommends that you consult with design professionals familiar with the type and scope of project to be built. Training is available by contacting BuildBlock Building Systems LLC at buildblock.com or 866-222-2575.

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BuildBlock Building Systems, LLC, assumes no responsibility regarding the use of its products or any other third party products referred to in this document. It is the full responsibility of the user to comply with all applicable regulations and building code requirements concerning the use of these products and any other products outlined in this product manual. It is further the responsibility of the user to research and understand safe methods of use and handling of these products. To properly comply with the building codes in your area, contact your local distributor, dealer, or building code inspector.

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ACKNOWLEDGMENTS

The original BuildBlock Swimming Pool Installation Manual was created by Mike Garrett for BuildBlock Building Systems LLC.

Technical Writers: Mike Garrett, Brian Corder, and Micah Garrett.

Technical Drawings: Brian Corder, Micah Garrett and Dennis Micoff.

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Figure 1: Pouring the ICF walls and floor of a pool.

BUILDING A BUILDBLOCK ICF SWIMMING POOL

OVERVIEW & INTRODUCTION

BuildBlock Insulating Concrete Forms are an excellent product to use to build a swimming pool. The simplicity of the forming system allows you to build a structurally sound pool that benefits from added thermal insulation. You will be able to extend your swimming season, reduce energy costs for heated pools, and lower overall maintenance costs. BuildBlock ICFs can be used for any size pool or design and create a cost-effective and time-efficient solution for pool construction.

BuildBlock has invested significant time and resources to help you design and build a high-quality ICF pool. We have taken the time to create prescriptive engineering that provides a framework for below and above grade pool applications. These engineering tables provide a wealth of knowledge and create peace of mind knowing your pool will be strong and durable.

We created this manual in conjunction with building a test pool. This allowed us to test multiple accessory products and installation methods. We want to share our experiences and best practices in this guide.

We hope that this manual will help you build a superior pool that you can enjoy for years to come.

HOW TO USE THIS DOCUMENT:

This guide covers many different topics for designing and building both backyard or small commercial swimming pools. The techniques and methods in this guide can be used when constructing any size pool or water feature. We outline most basic options and details to get pool builders. Building a swimming pool requires many different construction skills. Use this document to help you construct the areas that you feel confident building. Seek out the appropriate professional assistance when you are not confident in your skill set to complete the task.

Please note there are many options, methods, and details that this document cannot cover. This guide is intended to be a starting resource for your project. If you have other comments or questions, please reach out to our office directly.

BuildBlock has also created other resources and manuals that give in-depth explanations of the concepts and skills needed to construct an ICF structure including a pool. If you are unfamiliar with any of the construction concepts in this manual, please reference our other manuals that cover many of these topics in more depth. These resources and more can be found on the BuildBlock website (buildblock.com) and our YouTube Channel https://YouTube/c/BuildBlockICF.

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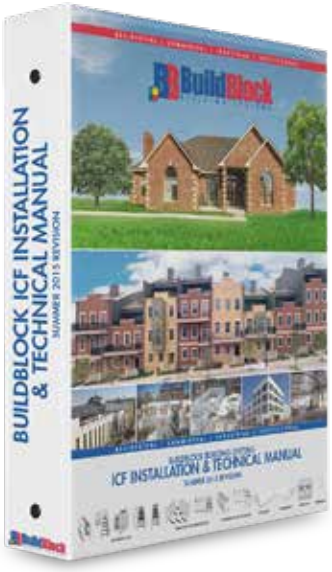
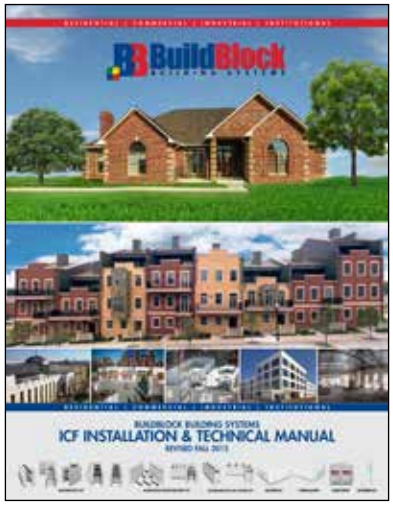


BUILDBLOCK ONLINE RESOURCES

BuildBlock resources are all available online. Visit the BuildBlock website, training website and other resources at https://buildblock.com



BUILDBLOCK INSTALLATION AND TECHNICAL MANUAL.

This document covers installing BuildBlock ICFs start to finish. Many of the methods outlined in this manual apply to the construction of an ICF pool. The ICF construction process is straightforward and accessible to individuals of all skill levels. Use local professional resources when possible if you have questions.

BUILDBLOCK COMPREHENSIVE GUIDE TO ICF WATERPROOFING.

This document covers waterproofing ICF walls and structures. Paying proper attention to the movement of water around your pool can help deliver a longer lasting pool with less maintenance.

You may deem this a necessary step depending on site conditions. This guide will provide installation and accessory product suggestions.

BUILDRADIUS PRODUCT AND INSTALLATION MANUAL.

This document covers information about the different radius blocks, installation techniques and technical information. The BuildRadius forms were designed to create pools of different shapes and sizes. BuildRadius forms are currently only available in a 6-inch core thickness. This guide will help you create other radii and integrate them with the ICF wall.

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BUILDBLOCK ICF SWIMMING POOL ENGINEERING MANUAL.

This prescriptive engineering manual is specifically for the design of swimming pools, cisterns, and other structures that hold water. This manual will be the most important design guide for your pool project. All foundations, engineering, steel rebar reinforcing requirements, and height limitations can be found in this manual. This manual does the size and complexity of pools can be built based on this engineering. If you require site specific engineering, your engineer may use these tables as a starting point for your project.

BUILDBLOCK CAD DETAILS.

This CAD details section of the manual provides a broad range of construction details that might be useful in your project. Construction of an ICF wall is standard across many types of construction both residential and commercial.

BUILDBLOCK (ICFs) INSULATING CONCRETE FORMS (4"-8" CORE SIZES) & BUILDLOCK KD (4"-12"+ CORE SIZES)

BuildBlock ICF forms combine the standard features you've come to expect in a quality ICF and unique patented improvements you'll find in no other block. BuildBlock is the most install friendly ICF on the market creating less waste, installing quickly, and eliminating costly accessories.

All BuildBlock forms are designed to save time, money, and hassle from beginning to end. BuildBlock is designed to create the strongest structures on time and on budget.

BUILDRADIUS FORMS

BuildBlock developed its radius forms specifically with pools in mind. Using radius forms in an ICF pool design is not required, but these forms make building complex curves and rounded edges as simple as stacking standard blocks. There are six different radius block 90-degree arc lengths: 2', 4', 8', 12', 16', and 20 feet. The measurement for the arc is based on the outside length that the block travels in a 90 degree turn. Note the table later in this manual for more detailed dimensions and information. This information is also found in the BuildRadius manual.

DRAWING WITH BUILDRADIUS

When working with the radius blocks, often an arc line can be drawn that matches the specific dimensions of the product, and then a wall type can be applied directly to that arc line to create the needed curvature.

You can also visit the BIM section of the BuildBlock website to download models in 2D and 3D that will work in a variety of different software platforms.

The pool engineering manual is one of the best resources when starting a design. Noting these points will prevent potential mistakes during the design phase of the pool.

BUILDCRETE POOL PLASTER

BuildCrete Pool Plaster adheres and bonds extremely well to EPS foam and concrete. When curing, it forms a crystalline structure that mechanically binds to the foam making it nearly inseparable. BuildCrete Pool Plaster can also be used as a base coat to float and attach tile, or as a base for other desired finishes such as marbleized plaster or Pebble Tec. It is easy to patch if you have future issues, and is 100% waterproof. It is also resistant to staining and algae.

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DRAWING ICF POOL PLANS

It is important to design and draw your pool to scale by hand or with a CAD based program. Having a drafted plan will ensure that your project is built to the correct dimensions and gives a reference when working with other contractors.

Before you begin designing, please reference the Pool Engineering Manual. It provides suggestions on which block size to use based on the parameters of your pool design. Review the subsequent sections of this guide for more information.

ICF blocks come in standard core thicknesses. Generally, when buildig a pool will be using 6" or 8" core ICF blocks will be used. This size means that the concrete will be 6" or 8" thick and contained in 2 1/2" of foam on either side. This gives a wall thickness of 11" or 13" inches. Please note that BuildRadius forms are currently only available in the 6" concrete core size.

Pro Tip

Review table "1.0" and consider the actual radius and diameter of each type of radius block. Note the arc radius as opposed to the actual inside or outer radius of the block. This sometimes creates an area of confusion for designers.

In most CAD based programs a wall thickness can be specified and the plan created just as a top down floor plan would. When working with the radius blocks, often an arc line can be drawn to a specific radius. The wall type can then be applied to the radius line and connected to the rest of the drawing. Use this process to draw a variety of the different radius. You can also visit the BIM section of the BuildBlock website to download models in 2D and 3D for several programs and in a many file formats.

POOL ENGINEERING

Read the pool engineering design manual which can be found in the resources section of the BuildBlock website. The manual lays out a range of design parameters that will form the structure of the pool. The manual references wall heights, rebar, core size, and footing information. Do not skip reading this document. Take the time to read and review all notes and details. Understanding this document will assist in your design and safe construction of your pool.

In the BuildBlock Pool Engineering Manual there are design tables for above and below ground pools. Note the different tables for core thickness of 6" and 8" walls along with heights above and below 4 feet. Soil conditions, wall height and backfill volume dictate the concrete core size and rebar required. As a rule of thumb, increases in wall height and backfill volume increase the necessary core thickness of concrete and amount of reinforcement required for the wall. Consult with local code officials regarding information related to soil conditions. Please review the tables in the manual before drawing your plans and making a block purchase.

Pro Tip

To minimize ICF waste, design your pool using ICF friendly dimensions. All webs have 6" spacing. Designing in 6" wall length increments will decrease product waste. All ICF forms are easy to cut and any piece that has interior web remaining can be used in other places in the wall.

BuildBlock ICFs have a 1" repeating pattern, so you can cut off as little as 1" and use the remaining portion of the block with the webs intact. ICF walls can be designed in smaller increments so don't limit yourself. For maximum ease of installation keep dimensions in one-inch increments at a minimum.

The manual also covers standard footing sizes for specified wall heights. Consider soil conditions and the loading characteristics of the walls. All footing designs are based on a minimum soil load of 2000 lbs/psf. There are several details that are referenced throughout this manual. Reference these details throughout your build to prevent challenges and costly mistakes.

SWIMMING POOL DESIGN BASICS

The swimming pool design is one of the most important decisions you can make. This choice will directly affect the construction, required level of maintenance, location, excavation, and experience needed.

POOL SIZE

The average residential pool size in the North America is roughly 15'x30' although sizes can vary greatly from region to region. The smallest pools are usually about 10'x20' and the largest are typically around 40' long built for lap swimmers. ICF pool are generally finished using a pool plaster or other finishing system or use a pool liner.

POOL LOCATION

Take into consideration where on your property you will place the pool. There are several factors that can influence this decision.

- Water runoff from your house and neighboring areas. This will also affect the type of coping or decking you choose. If needed, berms, French drains, and waterways can be built to divert water around and away from the pool area.

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- The visibility of pool from inside house or deck both for aesthetics or supervision.
- The location of utilities or easements, In most areas these are buried in the backyard or run overhead and may have to be moved if within the pool area
- The location of pool equipment, which is usually near the house or a designated area nearby. This is usually an area of 4'x8' and should be nearby to reduce plumbing distance and provide easy access to utilities.
- Pool acces. How will people access the pool? What type of fencing is required or other safety concerns such as permanent covers, etc.

TRADITIONAL POOL STYLES

There are three common styles of pool designs that are popular today: level, sport and traditional. This doesn't affect the shape of the pool, but the design of pool depth. Each of these styles have advantages and disadvantages. Choose the best style for you based on your pool needs.

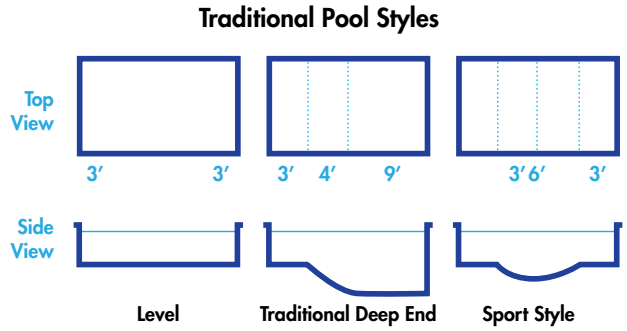

Figure 2: General Pool Styles

LEVEL POOLS

This pool doesn't have a deep end in a traditional sense. It will have a slightly sloped end toward the drains, but in general is the same depth across the entire pool length. If you are building the pool for lap swimming or site challenges such as a high water table area or some other geographical challenge, such as rock formations which won't allow deep excavation for pool construction this may be the best choice.

This is the style of pool built as an example for this manual. It works extremely well as a swim-in-place pool using the Fastlane System by Endless Pools.

TRADITIONAL POOL WITH DEEP END

These are sometimes called hopper pools and is a very popular style. It's what most people think of when they think of an in-ground swimming pool. It has a shallow end, with stairs for entry and exit into the pool on one end. The opposite end is the deep end and may feature a water slide or diving board and uses ladders mounted to the sides for entry and exit.

SPORT POOLS

This style is ecoming increasingly popular. A sport swimming pool design features shallow ends on both ends of the pool, and is deeper in the center. This pool design makes it easy for pool games where both sides will be at an equal depth. Other features such as diving boards and water slides are also possible, but must be designed so that they comply with depth requirements and have plenty of room.

CHOOSING YOUR POOL SHAPE

The specific pool construction site may strongly influence the pool design. Tight space constraints may require a smaller Kidney or Lagoon shape. Landscaping will also influence how the pool is designed. All of these decisions are yours to a make, but once decided, very little can be changed.

In terms of pool shapes, there are endless possibilities, but there are several common shapes to choose from that cover the majority of pools built today.

RECTANGULAR POOL DESIGN

The most popular pool shape of all time is a simple rectangle. This basic geometric shape and proportion make it a suitable style for most outdoor spaces. This makes design easy and allows for the accommodation of features such as tanning shelfs, diving boards, water slides and other features.

FREE-FORM POOL DESIGNS

A free-form pool is a non-rectangular pool with flowing lines that can take virtually any shape. Moving from one rounded shape to another is visually pleasing and allows the pool to integrate into landscaping or other site considerations.

LAGOON POOL DESIGN

A lagoon pool design is a free-form pool with an enhanced serpentine shape.

ROMAN END POOL DESIGN

A roman end is a squared end with a centered arch. This classic design is popular in many different settings and can have a single arched end or a double.

INFINITY EDGE POOLS

A infinity edge (also called a vanishing edge) lowers one or more sides of the pool so water can spill over the pool lip, giving the appearance of a vanishing waterline.

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POOL DESIGN SHAPES

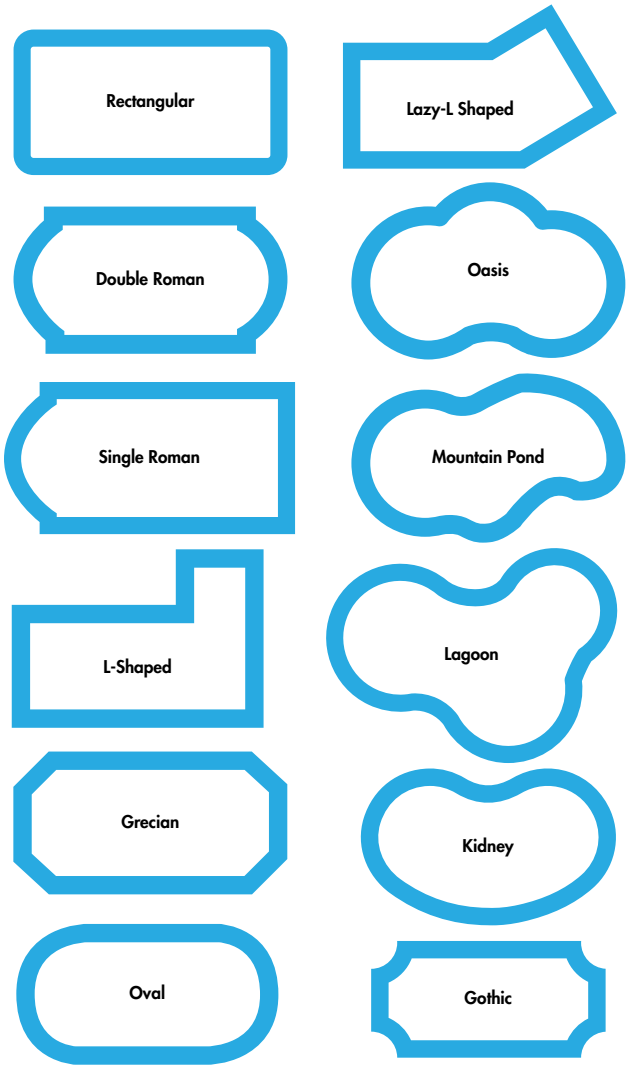

Figure 3: Examples of pool shapes.

DIVING BOARDS & WATER SLIDES

If you want a pool with a diving board a traditional deep end pool may be required. There are standards that will determine the depth, slope and distance at depth needed to safely accommodate these features. Diving boards typically requires a larger pool which are well suited for Rectangle, L-Shape, or Larger Free Form pools shapes.

If you prefer a pool without a diving end port bottom or level bottom pools are great for activities and games such as volleyball, basketball or other pool games. These types of pools are more popular today, providing more usable play area, but these pools are typically non-diving swimming pools. The shape, size and depth will determine what features your pool will safely support.

POOL SPECIALTY FEATURES

Determine what other design features you will want to integrate into the pool such as a hot tub, change in depth for a tanning shelf or swim up seating, spa, water features, waterfalls, or other elements. Planning for these features is critical when creating the pool design.

POOL SAFETY

Safety features are also a consideration when designing your pool. Requirements such as fencing, roll-away pool covers, in place covers, or other safety options must also be consider.

POOL FINISH OPTIONS

BUILDCRETE POOL PLASTER

BuildCrete Pool Plaster is the recommended finish for all ICF pools. This coating system is robust and durable and will outlast other systems on the market when installed correctly. This finish is a unique synthetic coating that uses an embedded fiberglass mesh and is applied in a single coat. As it cures that material crystalizes and grows into the EPS foam surface.

This mechanical attachment as well as the strong 11oz mesh deliver more than 3500psi of strength to the surface of the pool. The material is 100% waterproof and doesn't support the growth of mold or mildew. It is very easily cleaned as needed and can be colored to meet your design needs.

This material can also be used as a base for the tile or combined with thinset or other finish options. This finish is also used on the concrete pool floor. It bonds extremly well and provides a unified look and texture. Refer to other sections in this manual for more information.

POOL LINERS

Pool liners are one option for building an ICF pool. The specifics of liner pools are outside the scope of this manual, but there are several basics we will address.

FLOOR CONSTRUCTION

There are several options for the construction of the pool floor. This can include a sand bottom, Vermiculite, or concrete.

SAND BOTTOM POOLS

Sand is generally not recommended because there is no structural floor. This prevents structurally joining walls to the structural floor of the pool and is outside the scope of BuildBlock Swimming Pool Engineering.

VERMICULITE BOTTOM POOLS

Vermiculite is a combination of Portland cement, sand, and vermiculite. After the walls of the pools are positioned and poured, vermiculite is mixed with Portland cement and then troweled on the bottom of the pool creating the floor and cove transition. It takes several hours to install that must be rain free until the material has set.

It is slightly softer than concrete to walk on and was developed to provide a structural pool bottom (an improvement over sand), but also be porous to allow groundwater to move through it to prevent cracking.

If ground water is an issue, proper waterproofing and groundwater management should be used in conjunction with a gravity drain to daylight or a sump system. Groundwater intrusion can cause floating and other problems with the liner. See Groundwater Management section later in this manual.

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CONCRETE POOL FLOOR

The ICF mix for the walls is also be used for the pool bottom. The pool walls and floor should be poured at the same time and structurally tied together as described later in this manual.

COPING AND TRACK

The coping and track to attached a liner will be dictated by the liner choice. We recommend a poured coping with the track using forms made by Stegmeier. If using a different track system you may want to consider a Double-Taper Top block for extra concrete bearing at the top. If not feasible, you can field cut the top forms between webs, leaving 1" of foam at the top. Brace and strap appropriately before pouring. Other systems, tracks, etc. are possible but outside the scope of this manual.

Refer to liner or manufacturer installation instructions.

ICF TEST POOL DRAWINGS

ICF POOL DIMENSIONED TOP VIEW

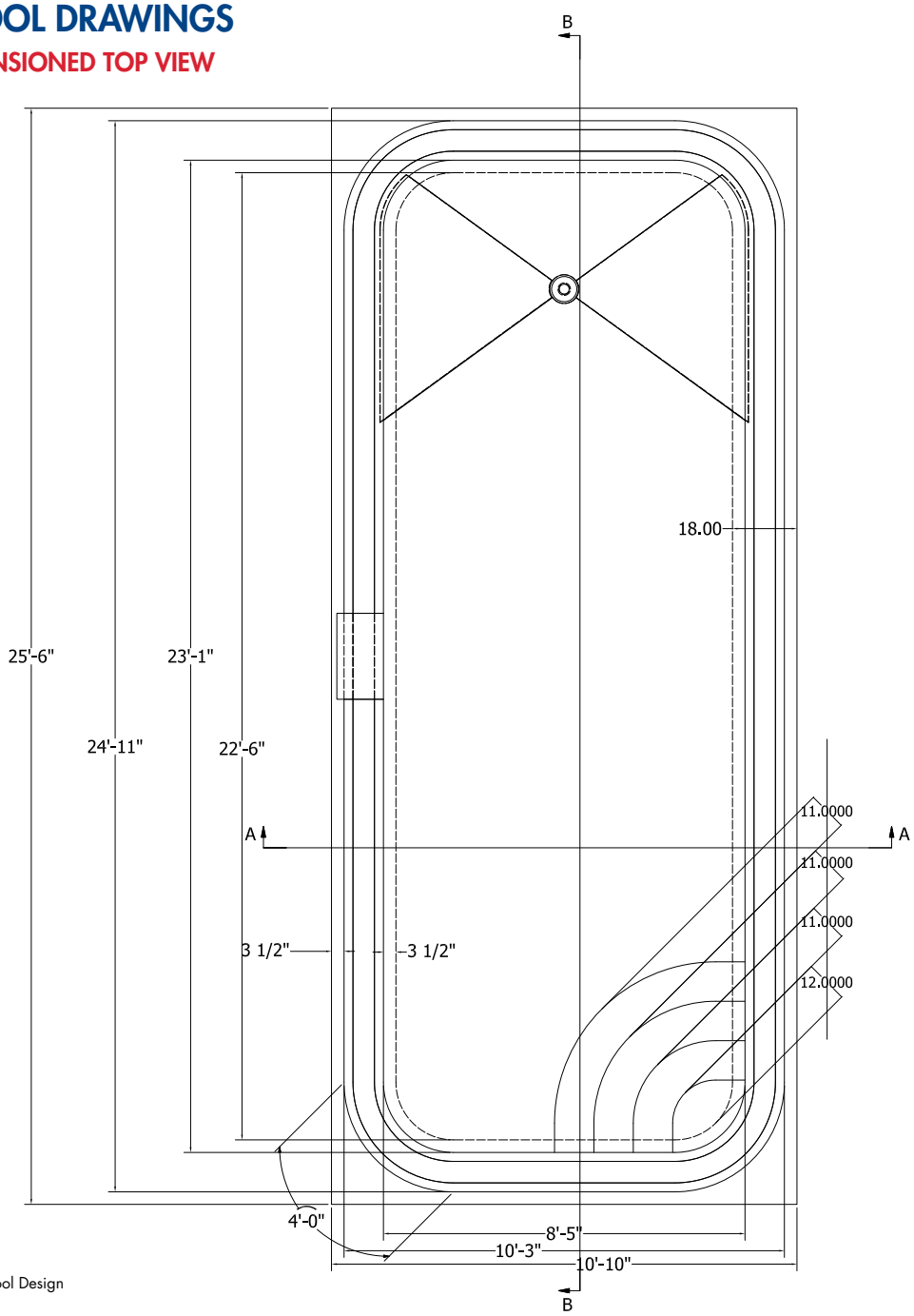

Figure 4: BuildBlock Test Pool Design

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ICF POOL DIMENSIONED ELEVATIONS

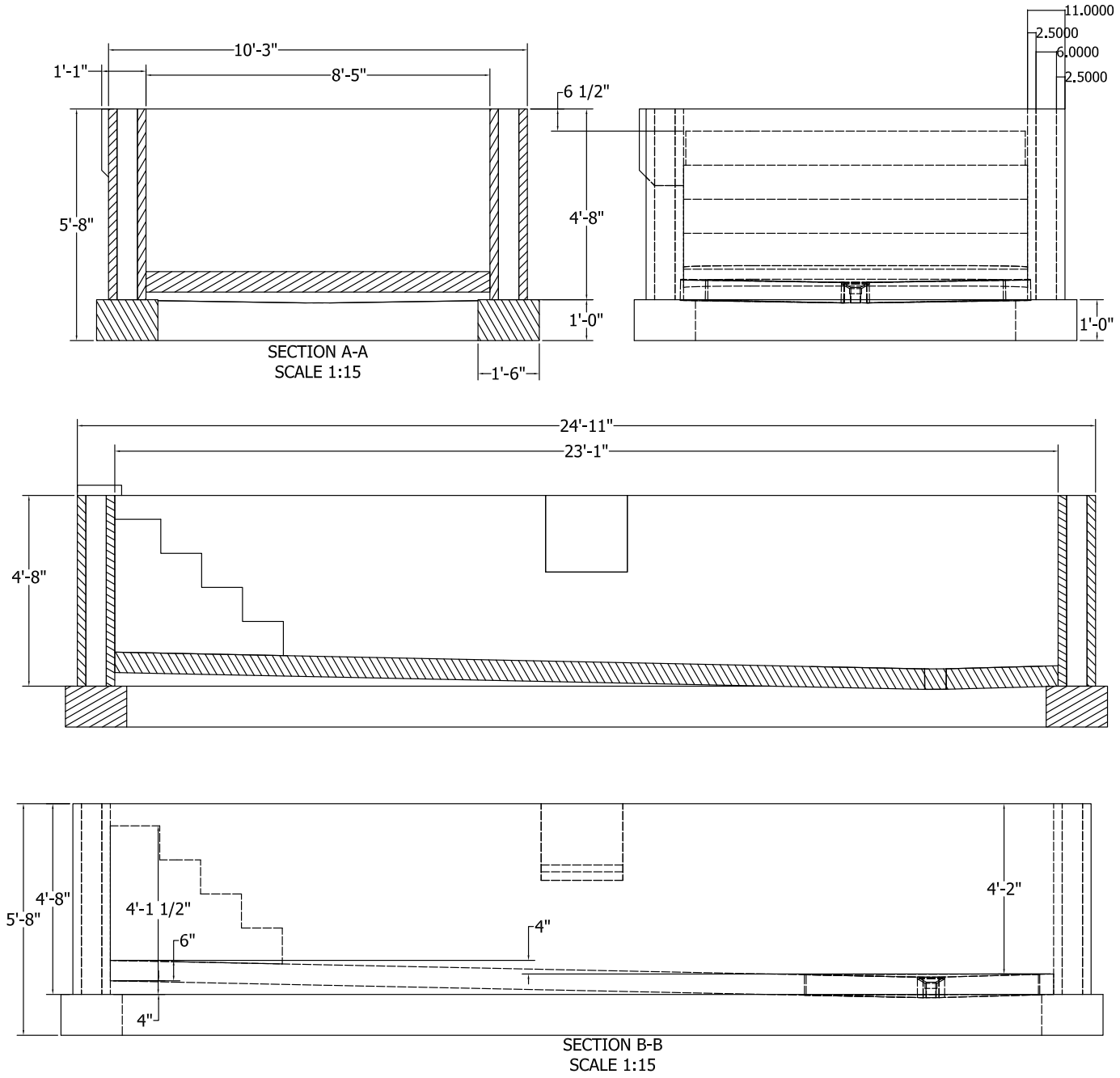

Figure 5: BuildBlock Test Pool Design Elevations

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ICF POOL DIMENSIONED ISOMETRIC

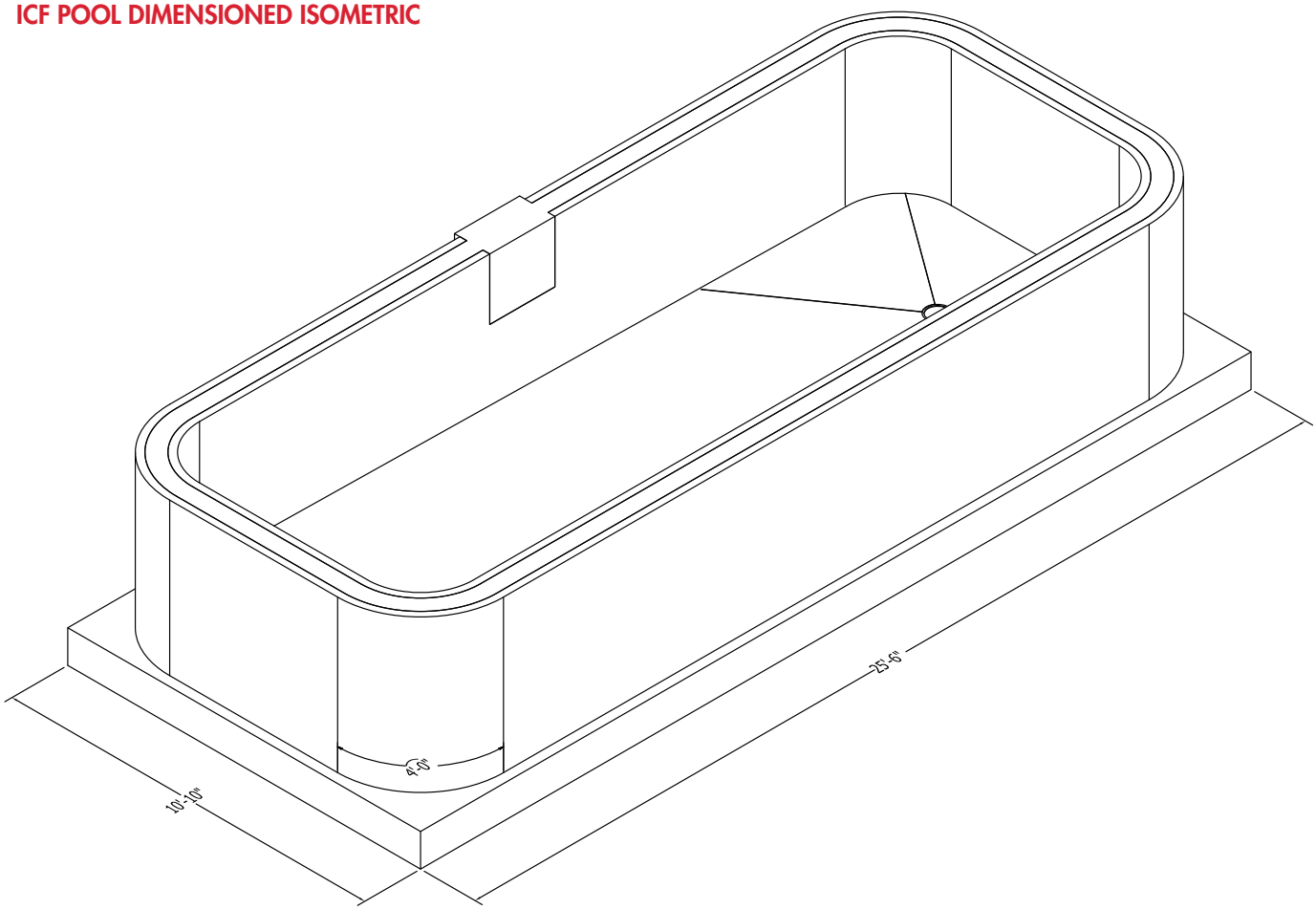

Figure 6: BuildBlock Test Pool Design Isometric View.

Figure 7: Completed BuildBlock Test Pool.

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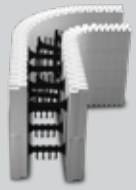
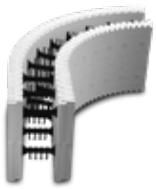
TABLE 1.0 BUILDRADIUS SPECIFICATIONS

SPECIFICATIONS						
PRODUCT ID	BBR-602	BBR-604	BBR-608	BBR-612	BBR-616	BBR-620
90° ARC LENGTH	2ft / 60.96 cm	4ft / 121.92 cm	8ft / 243.84 cm	12ft / 365.76 cm	16ft / 487.68 cm	20ft / 609.6 cm
BLOCK ANGLE	90°	90°	22.5°	15°	11.25°	9°
OUTER ARC LENGTH	24 in / 60.96 cm	48 in / 121.92 cm	24 in / 60.96 cm	24 in / 60.96 cm	24 in / 60.96 cm	24 in / 60.96 cm
INNER ARC LENGTH	20.1875 in / 51.27 cm	30.68 in / 77.94 cm	19.75 in / 50.16 cm	21.125 in / 53.65 cm	21.8125 in / 55.40 cm	22.25 in / 56.51 cm
STRAIGHT LEG	18 in / 6 in 45.72 cm / 15.24 cm	12 in / 0 30.48 cm / 0	0	0	0	0
PANEL HEIGHT	16 in / 40.64 cm	16 in / 40.64 cm	16 in / 40.64 cm	16 in / 40.64 cm	16 in / 40.64 cm	16 in / 40.64 cm
OUTER PANEL SURFACE AREA	5.333 ft^2 0.4951 m^2	6.667 ft^2 0.6193 m^2	2.667 ft^2 0.2477 m^2	2.667 ft^2 0.2477 m^2	2.667 ft^2 0.2477 m^2	2.667 ft^2 0.2477 m^2
INNER PANEL SURFACE AREA	4.19 ft^2 0.3892 m^2	4.743 ft^2 0.4406 m^2	2.194 ft^2 0.2038 m^2	2.347 ft^2 0.2180 m^2	2.424 ft^2 0.2251 m^2	2.472 ft^2 0.229 m^2
CONCRETE VOLUME	0.056296 yd^3 0.043041 m^3	0.105645 yd^3 0.080771 m^3	0.045099 yd^3 0.03448 m^3	0.04642 yd^3 0.035490 m^3	0.04715 yd^3 0.036048 m^3	0.047606 yd^3 0.036397 m^3
OUTER DIAMETER	2.55 ft. / 30.56 in 77.72 cm	5.09 ft. / 61.12 in 155.14 cm	10.19 ft. / 122.23 in 310.59 cm	15.28 ft. / 183.35 in 465.73 cm	20.37 ft. / 244.46 in 620.88 cm	25.46 ft. / 305.58 in 776.02 cm
OUTER RADIUS	1.27 ft / 15.28 in 38.81 cm	2.55 ft / 30.56 in 77.724 cm	5.09 ft / 61.12 in 155.14 cm	7.64 ft / 91.67 in 232.87cm	10.19 ft / 122.23 in 310.59 cm	12.73 ft / 152.79 in 388.01 cm
INNER DIAMETER	0.71 ft / 8.5 in 21.64 cm	3.26 ft / 39.125 in 99.36 cm	8.35 ft / 100.25 in 254.51 cm	13.45 ft / 161.375 in 409.96 cm	18.54 ft / 222.5 in 565.1 cm	23.63 ft / 283.625 in 720.24 cm
INNER RADIUS	0.36 ft / 10.97 cm	1.63 ft / 49.68 cm	4.18 ft / 127.41 cm	6.72 ft / 204.82 cm	9.27 ft / 282.54 cm	11.82 ft / 360.27 cm
CIRCUMFERENCE	8 ft / 2.4384 m	16 ft / 4.8768 m	32 ft / 9.7536 m	48 ft / 14.6304 m	64 ft / 19.5072 m	80 ft / 24.384 m
EPS FOAM DEPTH	2.5" / 5" Total 6.35 cm / 12.7 cm Total	2.5"/ 5" Total 6.35 cm / 12.7 cm Total	2.5" / 5" Total 6.35 cm / 12.7 cm Total	2.5" / 5" Total 6.35 cm / 12.7 cm Total	2.5" / 5" Total 6.35 cm / 12.7 cm Total	2.5" / 5" Total 6.35 cm / 12.7 cm Total

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DESIGNING WITH BUILDRADIUS ICF FORMS

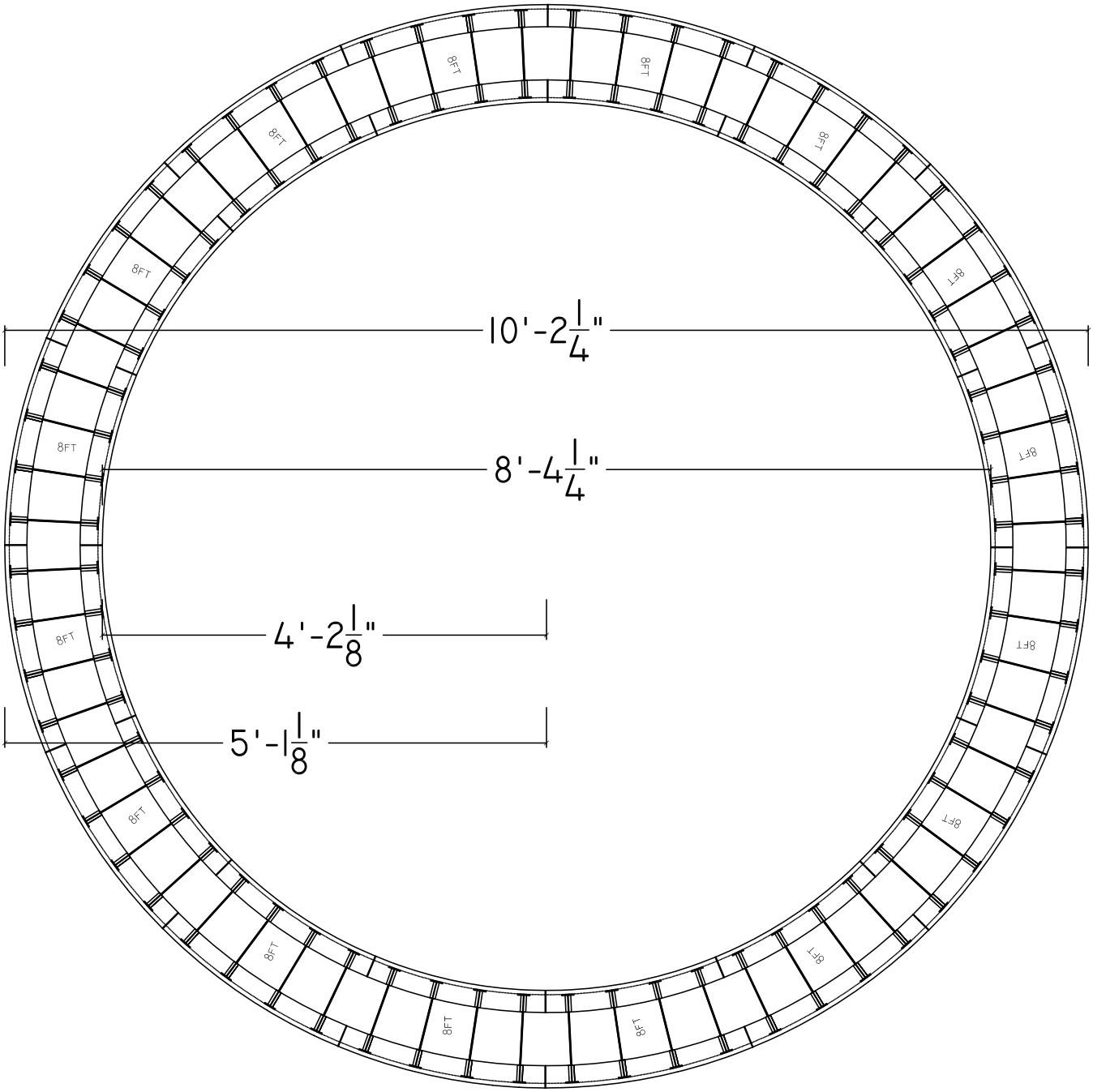
BuildRadius forms are available in 2ft, 4,ft 8ft, 12ft, 16ft, and 20ft arc radii. The 2ft and 4ft forms each turn 90° in a single form. The previous table has etailed specifications for these forms.

The following diagrams show the inner and outer radius and diameter of the 8ft, 12ft, 16ft, and 20ft BuildRadius forms. These dimensions may be used to construct pools and radius walls with BuildRadius forms and will require no custom fabrication.

Common seams where the curves intersect other curves or straight walls will require strapping or other reinforcement.

8' BUILDRADIUS DIMENSIONS

The following dimensions may be used to construct pools and radius walls with BuildRadius forms, and will require no custom fabrication.



8ft BuildRadius Dimensions

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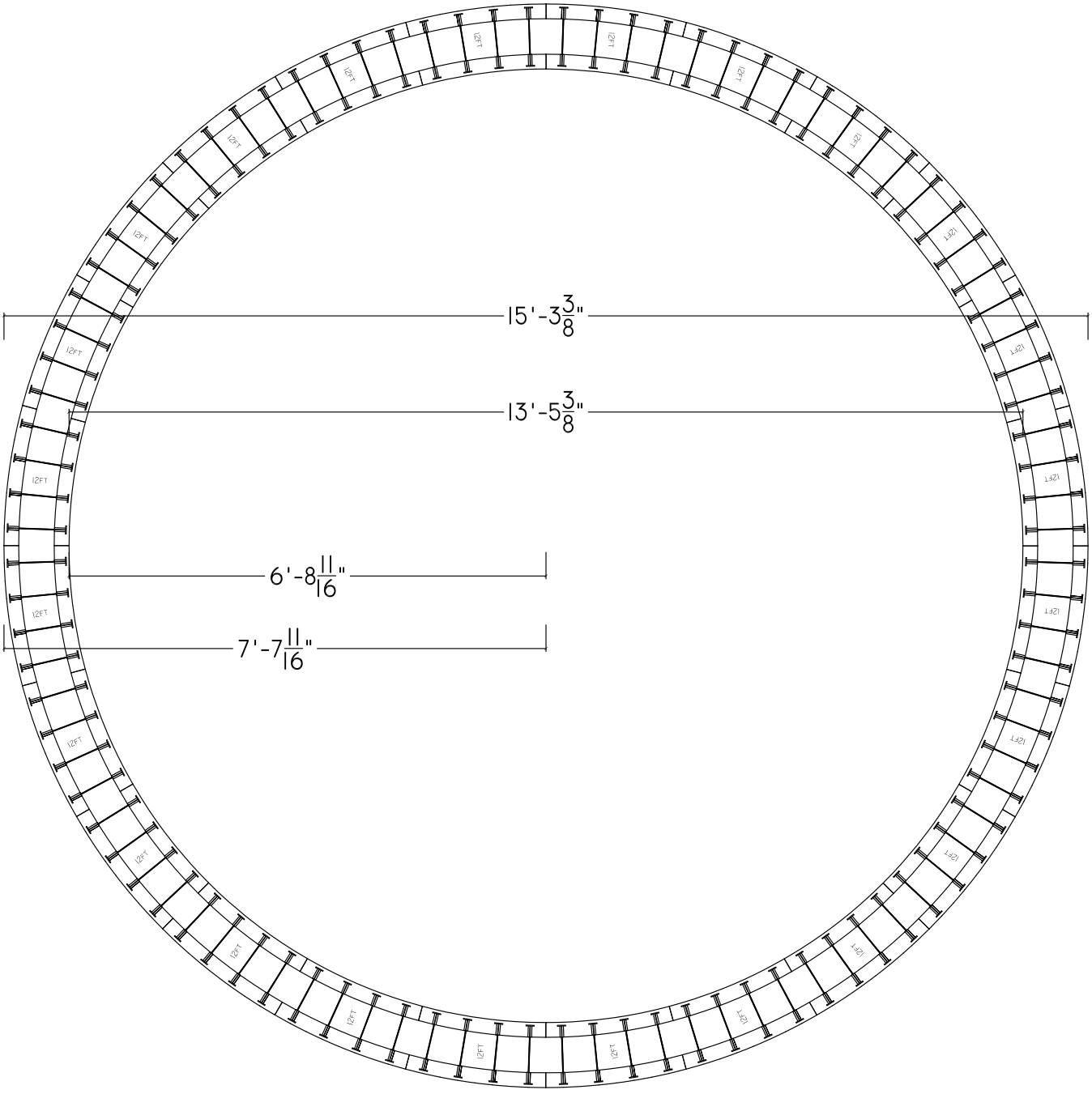
12' BUILDRADIUS DIMENSIONS

The following dimensions may be used to construct pools and radius walls with BuildRadius forms and will require no custom fabrication.



12ft BuildRadius Dimensions

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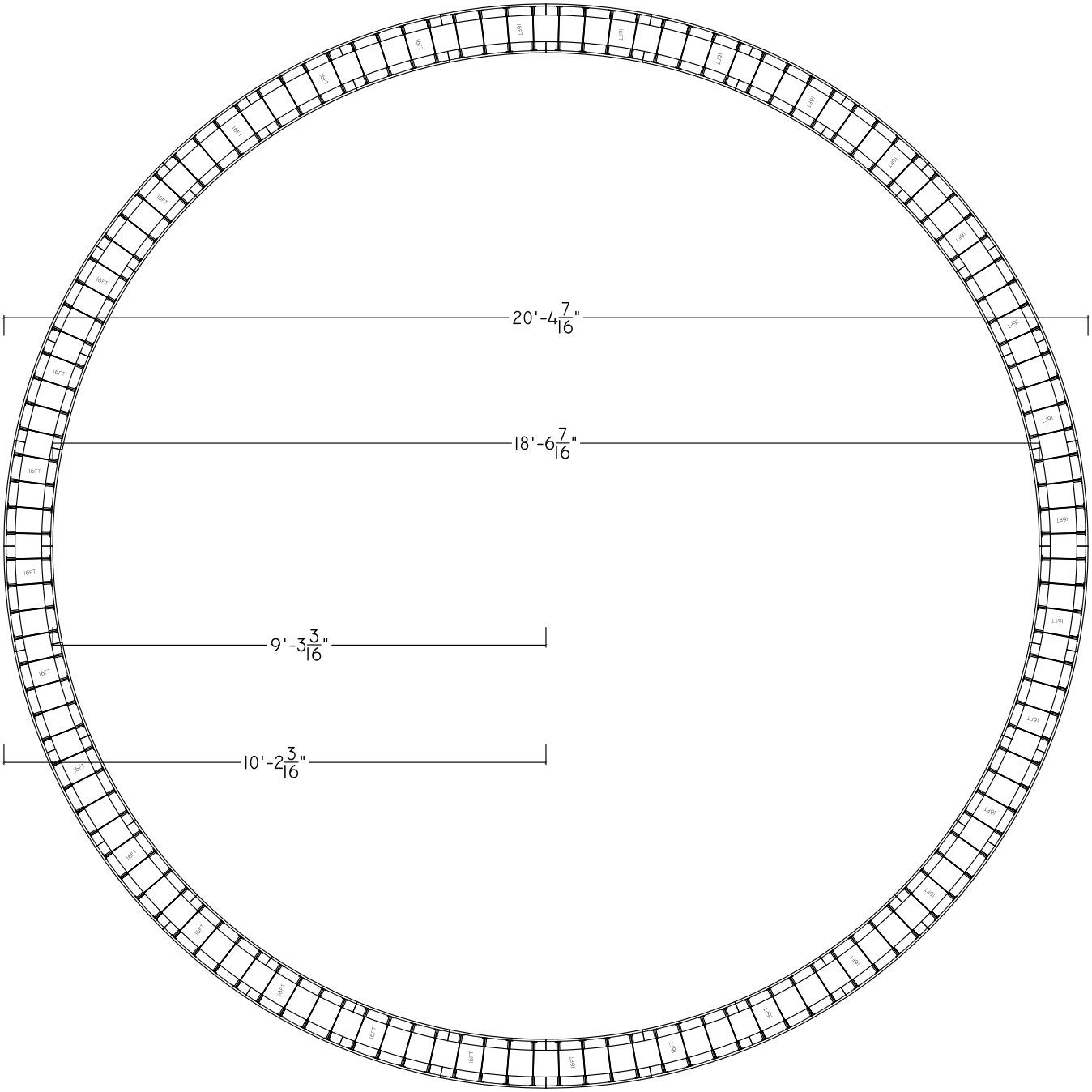
16' BUILDRADIUS DIMENSIONS

The following dimensions may be used to construct pools and radius walls with BuildRadius forms and will require no custom fabrication.



16ft BuildRadius Dimensions

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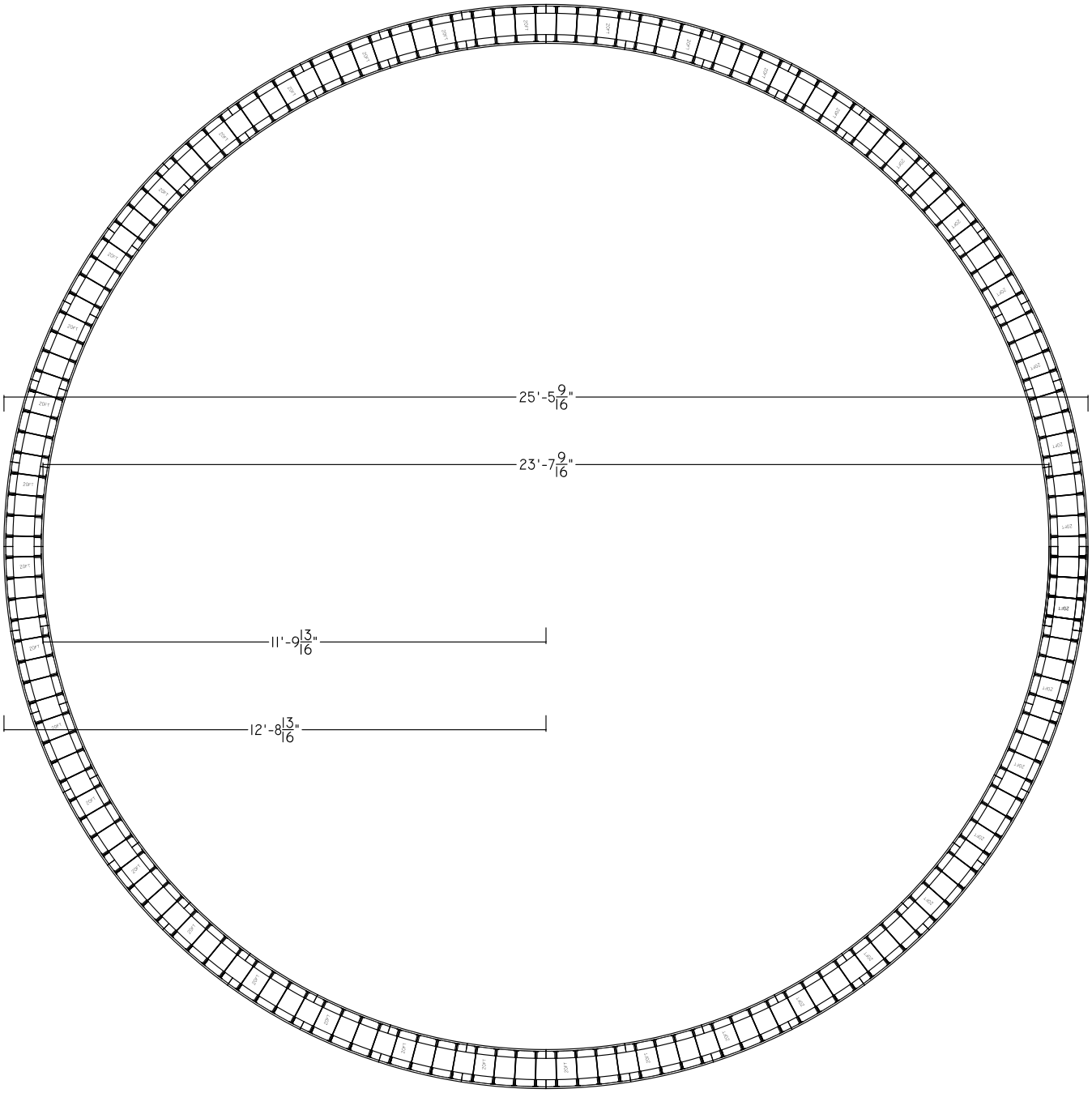
20' BUILDRADIUS DIMENSIONS

The following dimensions may be used to construct pools and radius walls with BuildRadius forms and will require no custom fabrication.



20ft BuildRadius Dimensions

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Figure 8: BuildBlock ICF Pool with footings poured and first two courses set.

INTRODUCTION TO POOL MATERIALS:

ICF pool materials can be broken down into three parts. The first part are the materials to build the structure. The second are the materials that are pool specific such as equipment and fixtures. The third are materials specific to the finish of the pool such as plaster and tile.

The structure of an ICF pool uses only a few basic materials. The walls are constructed on a footing made from concrete and rebar. The walls themselves are built using BuildBlock Insulating Concrete Forms, which are made from expanded polystyrene foam and polypropylene plastic webs.

The forms are filled with both rebar and concrete. The forms stay in place creating straight and stronger walls for your pool finish and providing a lifetime of insulation performance to reduce pool operating costs.

Pro Tip

Though it was usually cheaper to buy supplies on the Internet rather than getting an account with a local pool supply house. Having a local resource that is able and willing to answer questions and take in an interest in your project is worth it.

Take the time to research and talk with your local suppliers. Every marketplace is different, and it is also good to support local businesses when you can. In building our test pool we used several local and regional supply companies.

The coping on the top of the wall is usually a concrete or masonry product or natural stone. The pool bottom will often be a concrete slab, or when a liner is used sand, concrete or vermiculite.

Seating and steps can be constructed from a variety of materials such as EPS foam or formed from concrete making a solid base to build on.

Pool specific equipment varies basd on the applications and pool specific needs. Most every pool will have equipment such as drains, skimmers, lights, jets, pump, and filtration equipment.

Setup and style will vary from manufacturer to manufacturer. More complex equipment may be used depending on the application, pool use or size. The sky is the limit when it comes to unique pool equipment applications. Making these choices early in the process will dictate many design and construction decisions.

Pro Tip

How to finish an ICF pool is one of the main choices you need to make when building an ICF pool. Very few products adhere directly to the EPS foam and create a finish that will perform to our high standards.

To solve this problem we highly recommend BuildCrete Pool Plaster for the pool inside finish and for any outside finish for above ground portions where applicable. BuildCrete Pool Plaster has a long life and is 100% waterproof.

The third pool material that needs to be considered for an ICF pool are pool finishes. Common finishes for ICF pools include plaster, tiles, natural stone, liners, and other specialty finishes. Each of these finishes may align better with certain construction methods. Research is recommended early in the design stage.

Lastly, just add water and chlorine and you are ready to enjoy your beautiful new ICF pool.

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POOL MATERIALS

Once your pool is designed and you're ready to begin, we recommend purchasing all supplies in advance of construction. This will reduce construction time and ensure that you have all the products available to finish your build. Making sure you have all sleeves and other fixtures ready to mount in the forms before you pour will save time, hassle and eliminate costly mistakes.

Listed below in this section are most of the items you will need for the construction of your pool. This list is not intended to be comprehensive, but gives you an idea of the types of products you should consider.

TEST POOL COMPONENTS & MATERIALS

ITEM	MODEL / SPECIFICATIONS	SUPPLIER
Chlorine Feeder	Hayward Series CL100 or CL200 we used the CL200 size by pool size	In the Swim Discount Pool Supplies & Equipment
Concrete	Use a 3000psi or 3500 psi concrete mix with a 3/8" inch aggregate. Tell your concrete supplier this needs to be a pump mix. Usually concrete suppliers have a concrete design for ICF, but if they don't list out the above specifications. Contact us for more information.	Local RediMix Supplier
FastLane	Swim in place current generator by Endless Pools purchased from BuildBlock Building Systems.	BuildBlock Building Systems https://buildblock.com 405-840-3386 O | 866-222-2575 TF
Foam Insulation	Foam insulation can also be used under slab to improve the overall performance of the pool. It is recommended to use at least 1" inch EPS insulation panels under your slab and steel rebar. Source this locally using 2' foot by 8' foot sheets or 4' foot by 8' foot sheets. Make sure your fill under the insulation is level and smooth so there are no voids under the insulation.	Source from local building materials supplier or lumber yard.
Form-A-Drain	French drain system that is also used to form the foundations you can find out more about it from our website at the following link. https://buildblock.com/products/accessories/form-a-drain/)	BuildBlock Building Systems https://buildblock.com 405-840-3386 O | 866-222-2575 TF
ICF Blocks	BuildBlock ICF's can be purchased from our website.	BuildBlock Building Systems https://buildblock.com 405-840-3386 O | 866-222-2575 TF
Plaster	BuildCrete Pool Plaster The plaster comes in 75 lb. bags and a single bag covers 27 sq. ft. at 1/4 inch thickness and 21 sq. ft. at 3/8 thickness. 3/8" thickness works well on the walls and if using a concrete slab for the floor 1/4" works well there. Transition from walls to floor should be 3/8" inches thick. Note: The plaster is required to float the base of any tile used on BuildBlock ICF's. Very few materials attach directly to the foam. Note: When ordering pool plaster make sure to order the 11oz fiberglass mesh. The mesh can be shipped along with your of BuildCrete pool plaster. Plaster installation Instructions can be found at buildblock.com	BuildBlock Building Systems https://buildblock.com 405-840-3386 O | 866-222-2575 TF
Plaster Color	The BuildCrete Pool Plaster color can be aesthetically detracting, however, there are several ways to color the product and achieve a range of different finishes. We choose white color Ti02 for the test pool which matched very closely to the white concrete used for the coping.	Colors for the Plaster can be purchased from Direct Colors Inc. https://directcolors.com/

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Pool Coping and Liner Forms	The Cap Stone Form model # 9CF112 was used for the test pool and gave a 3.5 inch cap around the pool for the coping. It is combined with a PVC strip to cover the top of the tile which gives a clean straight finish under the cap on the tile top face. This material was purchased from a Local Stegmeier Dealer Note: There are many options for deck copings. Brick pavers, deck pavers, tile, or poured concrete shaped to multiple styles can all be used. Stegmeier LLC has a great catalog of different forms with multiple face finishes and styles. Other options may consider built in Fiber Optic or LED lighting around the top of the pool. pool cover insert attachments are also important to consider at this stage. Note: If installing a pool liner in lieu of using plaster or our BuildCrete Pool plaster there are fittings that can be installed in the pool decking or coping when they are poured.	https://www.stegmeier.com/
Pool Drain	Hayward WG1154AVPAK2 2 Inch fittings	Pool Supply World
Pool Education Resources	This manual doesn't cover everything. We found a great resource In our research we discovered the website Expert Pool Advice - Swimming Pool Steve. This site has a wealth of information and resources that you should find very useful.	http://swimmingpoolsteve.com
Pool Lights	Pentair Aqua-Light 250 Watt 120 Volt Model #77168100 with matching Spa Bright/Aqua Light Niche housing with 3/4" rear fitting model #78244200. This is the housing holding and grounding the light that is plumbed in place in the poured concrete. Note the housing with 1/2" fitting made it very hard to pull the wire through. Use 3/4" size at least which is the model noted. Also note the wire length needed for your application as the line is a waterproof grade. Larger pools my want to use 3 or 4 lights.	Pool Express
Pool Pump	Doheny's 2-Speed pumps 1.5 h.p. item #7814 for 110volt or #7819 for 220 volt. Very nice pumps for the price.	Doheny's https://doheny.com/
Pool Sweeper	Polaris Model 380 with 3/4 HP booster pump purchased from Pool Supply World. Note there are many pool sweepers on the market but have had good success with this model. It is expensive but performs well and is high quality.	
PVC Pipe	It is highly recommended to use nothing less than schedule 40 PVC pipe or higher on your entire job. For any electric wiring applications use waterproof ridged PVC conduit with the proper fittings to maintain its watertight service	These materials can be sourced from a local supplier.
Return Water Fittings	Hayward Spa Eyeball Jet Hydrostream Insider Fittings 3/4" Opening	Amazon sold by Pool Supply Town.
Sand Filter	Hayward ProSeries High Rate Sand Filter We will use the 27" model S270T or S27T2. With the Hayward Series Vari-Flo /XL valve on top. Note you will want to search out the correct size tank for your pool size off their website as well as the valve on top comes in different size fittings of 1.5 to 2 Inch. Try to match your pool pump fitting sizes to your valve size when you purchase them.	Pool Supplies Superstore https://poolsuppliessuperstore.com/
Skimmer	Hayward Auto-Skimmer Model SP1082 for in ground pools if for above ground pools use SP-1080.	
Steel Rebar	Use Grade 60 which is the most commonly stocked material. Make sure to review the engineering guidelines on bar sizing.	Source from local steel supplier or lumber yard.
Tile	Use only tile that is approved for pools. Normal tiles will spall over time. Adhesives such as thinset can be sourced locally from a tile store, or other building supply sources.	
UV Sterilizer	NUVO model #UV3000AUS Note we used both the chlorinator and the UV Sterilizer and it helped control algae throughout the swimming season.	Solaxx Water Treatment Solutions
Water Proofing	When waterproofing the exterior walls of the pool we recommend Poly Wall Home Stretch Membrane. Use in conjunction with a water based primer applied to the exterior ICF pool walls prior to the application of the membrane. Each roll is 200 sq. ft. of material.	BuildBlock Building Systems https://buildblock.com 405-840-3386 O | 866-222-2575 TF

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Figure 9: Excavation area marked and benchmark established.

SITE PREPARATION AND EXCAVATION

PERMITTING & CODE COMPLIANCE

Many areas in the country will require a building permit first. Construction plans including a site plan will need to be submitted as part of plan review. Some regions also require your contractor's name and license number. In other areas you have the right to build and name yourself as the contractor. Review these guidelines with local building officials. Consider any easements and utility lines that may impede your build and delay the permitting process.

Once a permit is acquired, start by laying out the rough dimensions of the pool using stakes. Plan for additional excavation around the pool so that you have room to work and install the footings and walls. An additional 3-4 feet should be adequate. Take note of typical excavation safety practices. It can be very dangerous working in excavated areas, especially with unstable soils, where walls can collapse inward on workers. It is important to follow guidelines, such as sloping the dig, benching, or supporting the dig in areas where you are digging deeply. It can be very dangerous working in unstable soil when a wall collapses inward on workers.

EXCAVATION SAFETY

Remember before digging to have utility companies mark their utility lines locations. Many areas of the country have "before you dig" services where utility companies will come mark the locations of any lines.

811®

Know what's **below.**
Call before you dig.

Figure 10: Be aware of underground services such as sprinklers and other private lines.

Additionally it is important to think about any service lines that may not be maintained by others. Services such as geothermal, septic and sewer, sprinkler systems, phone lines, TV and other private lines may all be present.

Also note that digging the hole for the pool creates a holding area for any ground water that is held in the soil above the bottom of the pool dig. Having a water pump available may be necessary to keep the hole dry. Often just a 1/3 to 1/2 H.P. sump pump with a water hose attached will suffice but there are times when a much bigger pump will be necessary. Remember ground water and rainwater will be an issue as well as runoff.

In some locations an exit trench may be dug extending from the deep end of the hole downhill to open ground. When digging the hole it is important to dig deep enough to handle the foundations. Depending on the foundation type it may be possible to dig trenches for the footing and leave the center area of the hole slightly higher.

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Figure 11: Elevations & finished pool dimensions established.

ELEVATIONS & BENCHMARKS

Before digging, establish your finished elevations and the exact dimensions of the finished pool. This can be done using batter boards or string lines. String lines will need to be removed while the dig is taking place. Place benchmarks well outside of the digging area, as the excavator will need room to work.

Figure 12: Keep all benchmarks established throughout the pool building process

Make sure to keep all benchmarks established throughout the pool building process. The benchmark will be used to set elevations throughout the build process. Mark the outline of the dig with chalk, Lyme powder, Portland cement powder, or wheat flour. This will ensure that the excavator stays as close as possible to the digging parameters set.

Over digging doesn't create as much of an issue as it does with gunite or other pool systems since the concrete is constrained in the ICF forms. But it will take more backfill and labor to correct.

Figure 13: Excavate the hole check finished elevations and depths of the hole

EXCAVATION

Excavate the hole. Replace the string lines and check finished elevations and depth of the hole. Ensure that adequate depth has been achieved. It is usually better to over dig than under dig. If possible use a construction laser level and measuring rod with receiver. This will save potential headaches and return trips from the excavator.

Take time to lay out your footing at this stage. Run a set of string lines, and ensure that any changes in elevation, such as stepped footings have been adequately excavated. This will save time and energy later. The more time spent verifying at this stage will help prevent potential future problems.

Figure 14: Plan for removal of excess spoil and retain material for backfill.

SPOIL & BACKFILL MATERIAL

Lastly, consider the amount of dirt that needs to be hauled off less the amount needed for backfill. Note that backfill must be soil that is adequate for that purpose and be highly compactable. Soil containing significant amounts of rock or sand will not be sufficient as they are not compactable materials.

High clay or expansive soils are not recommended either as they can create excessive back pressure on the walls due to fluid density. If this is a concern, it is best to contact a local soil engineer for their opinion.

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Figure 15: ICF Pool footings formed using Form-A-Drain a stay in place footing forming and foundation drainage system.

LAYING AND POURING FOUNDATIONS

FORMING THE FOUNDATION

Assuming the hole is dug properly to the correct elevations it is time to layout the pool foundation and walls. A BuildBlock ICF pool is built using the same type of standards and practices as you would use to build a basement, except the goal is to keep the water on the inside. Review the engineering details for footings to ensure that wall placement will be adequately supported. Since the hole was over dug, there should be adequate room to place string lines and batter boards.

The batter boards will be left in place until the walls are fully installed. Measure down from the benchmark lines set above the hole and transpose those lines with a plumb bob to the same positions in the bottom of the hole. Now place strings to the outside of the walls first and square your dimensions up aligning them with the above lines.

Set another set of string lines for the outside of the foundation and set their heights according to your plans and elevations. This will determine the pool wall height. Remember that blocks can be cut down if needed on the top course. Use your plans and the detail drawing PE4B on page 9 of the engineering manual to do this. Note that the outside edge of the foundations should be between 4 and 12 inches from the outside of the pool walls as per the detail.

Figure 16: ICF pool with step footings.

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POOL FLOOR SLOPE

In instances where a pool slopes towards a deep end, mark the exact locations where the steps in the foundations will be located. Steps will typically be done in 8" or 16" increments. BuildBlock ICF forms are 16" nominal dimensions and can easily be cut in half to match a typical 8" step.

Rebar pins can be set on the sides of the steps and stretched to the matching step on the other side of the pool. These can then be checked for level, ensuring that wall heights across the pool remain level.

Figure 17: ICF pool with sloped footing.

If more aggressive sloping is necessary, larger steps can be used. Cut the block according to the step dimension and ensure that each step has a minimum of 8-12 inches of block overlap. Each cut block will need to have at least two webs to ensure the block does not blow out at the base. Webs are on 6" centers. If using blocks with less than two webs, strap appropriately before the pour.

At the locations of each step, a thickened edge can be poured so that the footings overlap at this point. This will improve the structural strength at this transition point.

Figure 18: ICF pool foundation with gravel in place before installing rebar grid.

If gravel is being installed under the foundations, place the gravel at this time. The gravel should extend past the foundations around their outside expected locations by about 8" to 10 inches.

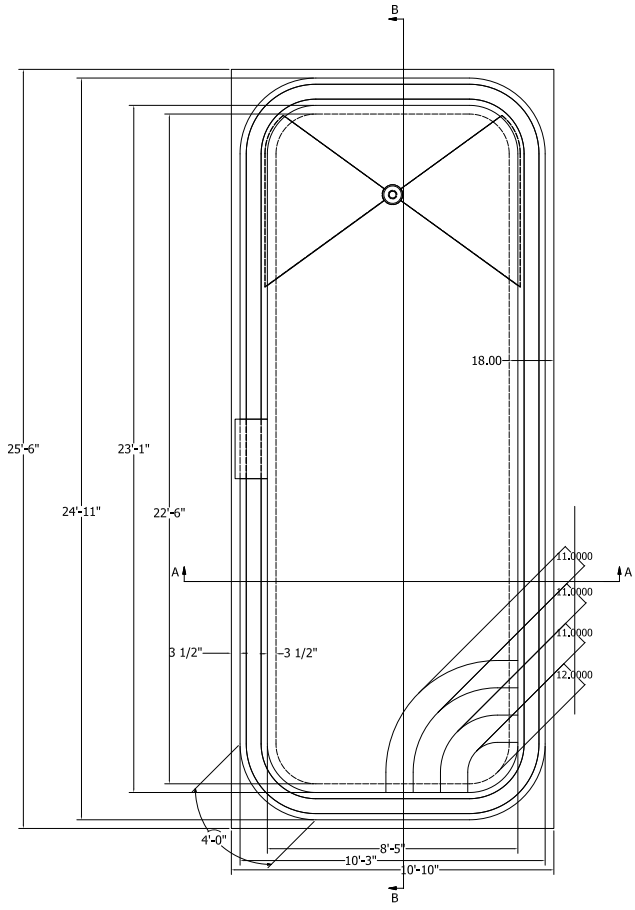

Figure 19: ICF Pool Design

It is important that all foundations are level. This ensures a level base to stack block and will require less shimming and trimming to have a plum level wall. If footings are not level, then after stacking the first two courses, blocks can be shimmed and trimmed on the bottom edge until the wall is level. Once level they should be spot glued on one side every 18"-24" to prevent movement. If the foundation is not level, setting the first and second courses of block becomes much more challenging.

Once everything is level and squared, footings can be formed. The pre-engineered footings in the engineering manual are 8 inches thick so 2x8's can be used. Stake and nail the boards slightly off the ground to make up the 1/2" that is lost in a standard 2x8.

Most steps will be taller on the downhill side, as excavation is rarely level. Footing width may change as wall heights increase. Increase the size according to the engineering manual. Brace across your form boards with 1 X 2's about every 2 feet to prevent them from spreading or separating during the pouring process.

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Figure 20: Rebar placed off the ground in the proper place for footing reinforcement.

Once all footing forming is in place, check heights and location of all forms. Set steel rebar according to the footing table in the engineering manual noted in detail PE3.

All rebar in footing should be 2 to 3 inches above the ground level so it will not corrode. Note, only place steel that goes inside the footing at this time. All dowels and stirrups that go into the walls and slab will be placed after the pour while the concrete is setting up.

Alternative reinforcing material such as fiberglass rebar may be used. It must conform with the required size and strength as specified in the BuildBlock Pool prescriptive engineering or site specific engineering. Other reinforcing materials such as Helix microrebar are outside the scope of this manual and have not been evaluated. Generally the greater the separation of water and reinforced concrete, the less likelihood of degradation of the concrete reinforcement.

STIRRUPS & DOWELS

Take the time to lay stirrups and dowels out where they are handy, but not in the way of the pour. Make sure they are staged ready for the pour. Review detail PE4B for information on spacing. Reference the steel requirements for wall heights in the engineering manual to properly size. Steel size can vary based on changing wall heights.

Figure 21: Use a corner block to establish the repeating pattern and properly space vertical dowels,.

To properly space the vertical dowels, use a corner block to establish the repeating pattern. BuildBlock ICF webs are 6-inches on center. Once the corner is established the placement of the bar can be repeated per the engineering guidelines for vertical bar spacing.

This will ensure that the vertical rebar does not align directly with any webs and will eliminate bending the rebar to fit the block while stacking. The stirrups will also be measured at this time. Follow the same spacing guidelines as the vertical steel. Make sure that all bars are pre-bent and ready for installation before the pour.

Before pouring begins, place sleeves large enough to accommodate any pool drains. Review all drain requirements, as specific code requirements may apply.

Figure 22: Pouring an ICF pool foundation and screeding the foundation level.

POURING THE FOUNDATION

It is now time to pour the foundation. Options for pouring may include a concrete pump, direct from the chute, or the use of a hopper elephant trunk that is a gravity feed system. The recommended slump for footings is usually closer to a 7-8" slump.

A slightly dryer mix will mean less pressure on the forms. (See slumping concrete in the BuildBlock Installation Manual.) Pre-cut several 2x4's slightly longer than the width of the foundations to level the concrete. Screed off any remaining concrete. Run the 2x4's back and forth along the top of the foundation to achieve a smooth surface. Rarely do footings need a troweled finish. Slightly rough concrete creates a better bond when pouring the walls.

Figure 23: ICF pool foundation poured with vertical rebar dowels and stirrups for the floor.

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Once the pour is finished immediately place all dowels and stirrups. Make sure that the concrete is still wet enough to properly consolidate around the steel. Rock the stirrups slightly to ensure concrete is consolidated around the steel and no large spaces remain.

Set the stirrups at the same level and orientation as the pool floor, adjusting slightly as needed for sloping bottoms or step footings.

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Figure 24: ICF pool walls stacked with reinforcement.

STACKING THE POOL WALLS

STAGING MATERIALS

After the concrete has set overnight it is time to begin stacking the walls. Strip the forms and sweep the tops of the foundations clean. Take time to stage horizontal rebar, block, and any bracing that may be used in the hole. Staging materials and tools will reduce trips in and out of the hole. Re-check string lines and benchmarks before starting.

Figure 25: First two courses of ICFs stacked and leveled.

LAYING THE FIRST COURSE

Note that there are several methods to lay out the first course of blocks. Use a combination of the following strategies to straighten and level your first courses. Start by first snapping a chalk line on the foundation marking the outside face of the block.

If radius block is being used, mark the places where curves transition to a new direction. This will most often be the most interior or exterior point on the wall and will give an expected destination for the curve to start or finish. Begin by first placing block in the corners of the deep end of the pool, and then working out from the corners.

The first course can be checked for level by placing string lines at the designated height of 16 1/2". BuildBlock ICFs are 16" tall nominally. The interlock on the footing will provide an additional 1/2" of height to begin. The levelness of the footing will dictate how plumb the first course of block is. Instead of leveling the first course it is preferable to stack the second course of block, tying the forms together and this will begin to self-level the block.

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Figure 26: ICF pool wall with vertical and horizontal rebar. Placed either side of center each course a vertical chase is created to hold rebar in place.

Note that before stacking the second course it is important to place horizontal rebar. As the second course is stacked remember that all webs align vertically. Once the second course is placed look for areas where the block is not in full contact with the footing, or where too much contact is causing the wall to raise up.

This can first be done visually but then should be checked with a combination of string lines or a laser level. Trim off the bottom teeth of the block to lower or add shims to raise the courses to level.

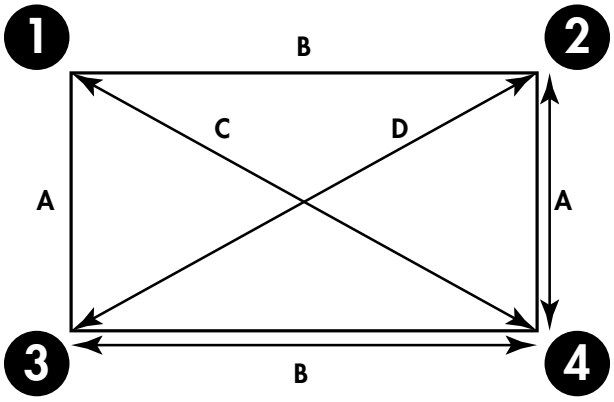

Figure 27: Diagonal Squaring Graphic

SQUARE, PLUMB, AND LEVEL

Check the first courses for square by measuring across the layout on a diagonal. See the BuildBlock ICF installation manual for more information on squaring. Once you are confident that the section is level and square, spot glue the block every 12"-18" inches with foam glue to hold in place.

Do not over-glue as the glue can expand and raise sections of the wall unintentionally. After the spot glue has set, double check level, square and plumb. Mark locations of vertical dowels on the face of the blocks to ensure proper placement of vertical dowels before the pour.

Since a pool is rarely one elevation you will need to repeat the leveling process as you continue stacking areas that are different heights. Make sure to repeat this process on all areas before you stack higher than two courses.

Continue stacking towards the steps and cut blocks on the bottom to extend over the stepped footing. It is best to have the block overlap in these areas, but a common seem can be used if the layout demands it. If webs are hitting rebar dowels coming out of the footing use a rebar bender to bend the piece of rebar into the middle between two webs. Continue stacking until the second course is finished around the entire pool. Only spot glue after each section of the pool is square and level.

Figure 28: Two courses of ICF wall stacked, shimmed and trimmed, spot glued in place.

INSTALL REINFORCEMENT

Once the first two courses have been laid and horizontal rebar has been placed, the hardest part of stacking is complete. Note that not all layouts will result in the perfect overlap of block between courses. Use common seams in areas where a minimum of 8" of overlap is not achievable. Remember to brace and strap these areas before you pour.

Figure 29: Pool dimensions will not always lay out to block sizes. Use common seams as necessary.

Lay horizontal rebar in the second course. By offsetting the rebar either side of center from course to course a vertical chase is created to hold and alight later placement of the vertical rebar. Stack the third course of block, and repeat horizontal rebar as required.

Once the fourth course of block is required, consider placing bracing on the wall. Any wall sections over three courses should have a bracing system, usually spaced every five to six feet. On sections lower than four feet, bracing is not required, however it is recommend to align and straighten the walls after a pour. Straightening a wall without an alignment system can be very challenging.

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Continue stacking the wall until you have reached the final benchmark lines set at the beginning. Check walls for plumb and heights for level. The top course can be trimmed if needed. Be careful to not knock pieces of cut EPS foam into the wall cavity. Remove any debris that fall into the wall cavity. Keep the wall as clean as possible.

Place vertical rebar in every location that matches the dowels coming out of the footing. This will be dictated by your prior layout and engineering. If the horizontal bars were offset either side of center or the tension side of the wall, then a vertical chase for the rebar to be slotted into will have been formed. This allows for a non-contact overlap to be used on the vertical rebar. No tying should be necessary. If you want to tie the top bar, that is appropriate.

Lastly strap all common seams using what scrap lumber you have available. 1/2" plywood cut into strips works very well. Set string lines on the top course and use the bracing to adjust the wall into plumb. Glue any gaps, and make sure block is ready to be poured.

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Figure 30: ICF pool steps poured with tile applied.

FORMING STEPS AND SETTING SLAB REBAR

PREPARING THE SLAB FOR CONCRETE

The next step is to prepare the pool slab for concrete. The walls will not be poured until the slab and other elements such as steps are prepared and ready. There are multiple ways to prepare the slab. The most important elements to consider is the slope toward drains, and how the transition from floor to wall will take place.

Set drain and piping through the sleeves placed under or through the foundation. Use number 3 pins to secure in place and level at top of slab height. Apply aggregate or fill as necessary. Ensure good compaction of the fill. Reference detail drawing PE4A for walls below 4 feet or detail PE4B for walls greater than 4 feet. If insulation under the slab is desired, place it at this time. Most of the heat loss in pools is from the sides and floor. The ICF will insulate the walls so adding standard white EPS foam underneath the pool floor is one of the best insulation options. EPS foam resists water and holds its R-value longer than most other insulation types.

Figure 31: ICF pool floor reinforcement tied into wall reinforcement provides additional strength.

Next refer to detail drawing PE4B make cut outs in the bottom of walls every 12 inches. Cut outs should be 4.5 inches wide and 6 inches in height so the slab covers the entire cut out area. The distance between webs should be close to 4.5 inches so cut out the full distance of foam between webs. Since the webs are 6" apart, achieving the 12" spacing without interfering with webs should be simple.

Preparing the floor in this manner by tying the floor rebar grid into the walls and lapping with vertical rebar will create and extremely strong structure that resists movement and settling.

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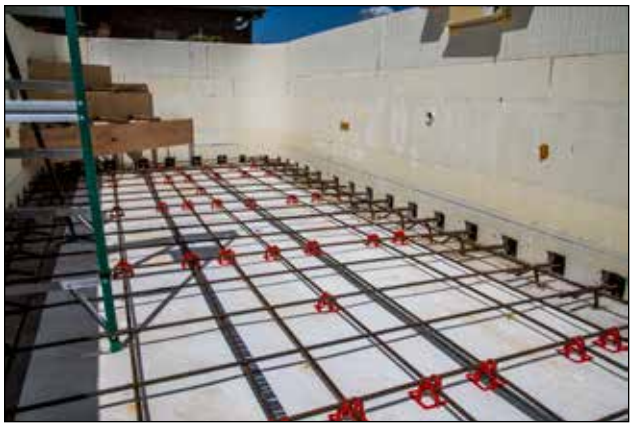

Figure 32: ICF pool floor reinforcement tied into walls, steps formed and pool floor slope snapped on walls with chalk line.

Snap a chalk line around the entire pool at the 6" level taking into account the slope of the slab. Use a keyhole saw to cut out the foam that will make the connections between the wall and the slab floor. The slab steel grid will extend into each cut hole center along with a number 3 bar 24 X 24 inches bent in the center. Stab the number 3 bar up the wall and tie the bar into the steel slab grid. The slab steel grid of rebar will be number 3 bars at 12 inch spacing in each direction per the engineering detail. Use chairs to support the grid so that it will be positioned in the middle of the slab. Follow all drawing details as specified.

FLOOR TO WALL TRANSITIONS

One last considerations before pouring the floor slab is to decide how the slab will slope or curve into the wall. Typically, a transition will be required so that when plaster is applied a joint does not form between the wall and the floor.

Two options for this transition include using cove cut EPS foam or hand troweling a concrete slope at this connection point. If a foam transition is selected, this will be applied after the slab has been poured and finished. If a hand troweled transition is selected, this will need to be done in conjunction with the pour. This requires more labor and is time sensitive during the pour; plan accordingly. Concrete does not bond extremely well to EPS foam, so if troweling a transition be aware this may be an area of weakness. EPS foam cove transitions may be ordered from foam fabricators.

Figure 33: ICF pool steps formed and reinforced. Rebar is tied into the wall at reinforcement at each level.

Lastly form any steps, benches, or special features that will be included in the concrete pour. Materials to form these features can be leftover ICF forms or other forming materials such as wood. To increase overall strength of features, use a similar method used to tie the slab to the wall. Creativity on the design will be needed. Take the time to over-support your forms, as form failure can be costly during a pour. Concrete has a limited working time and it is important that you can trust your installation.

Figure 34: ICF pool steps poured with forms stripped.

INSTALLING SKIMMERS, ELECTRICAL, AND PLUMBING

Before pouring the walls it is important to make all penetrations. This may include plumbing, skimmers and pool lights along with anything else that needs pass through the pool walls before placing the concrete.

Figure 35: Cutting teeth into one end of the PVC pipe for the sleeve makes it easy to cut a precise hole with little gap. Seal with foam and strap appropriately before pouring.

A simple way to make a penetration through the block is to take a piece of PVC that matches the needed hole size and cut serrated teeth on the end of the pipe. This piece of PVC becomes a make-shift saw and can be rotated back and forth to cut through the wall. When going all the way through the wall, make sure the piece is square and level so that the cut stays level. Also make sure that debris from your cut do not fall into the

Pro Tip

Skimmers that properly fit the correct dimension of an ICF wall can be hard to find. For the 6 and 8 inch forms the Hayward series Auto-Skim Model SP1080 and SP1082 works very well.

The model SP1080 is for above ground pools and the SP1082 is for in ground pools. It comes with a square top and lid and adjustable height on the lid rim which is essential for taller copings like the one used for our test pool.

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wall cavity.

Depending on the size of the pool, your pool may use two skimmers. Typically, they are placed in areas where the most debris can be collected based on wind direction. Follow the manufacturers installation recommendations. Often the skimmer will need a wide mouth on the interior portion of the wall. Also note that many skimmers will not match the typical wall thickness of the ICF.

Figure 36: Pool skimmer installed, front face formed and strapped.

Figure 37: Pool plumbing installed and braced. ICF compatible skimmer installed and strapped.

Take care when selecting your model or find a creative solution to support the unit. The unit used in the BuildBlock test pool is listed in the equipment section.

Figure 38: Pool skimmer installed and mounted. Framed and ready for HardieBacker® Cement Board for tile and finish.

Figure 39: Framed covered with HardieBacker® Cement Board for tile and finish.

Figure 40: Pool skimmer poured in place and mounted at the correct depth for the coping.

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Figure 41: Hydraulic lines for Fastlane Swim in place system installed and framed for HardieBacker® Cement Board for tile and finish.

Figure 42: Framed covered with HardieBacker® Cement Board for tile and finish.

ELECTRICAL

LIGHTING SLEEVE CONSIDERATIONS

When installing sleeves for lighting, note the specifications for the depth of the housing. BuildBlock used the Pentair Aqua-Light 250 Watt 120 Volt Model #77168100 with matching Spa Bright/Aqua Light Niche housing with 3/4" rear fitting model #78244200.

This housing fit nicely in the wall and allowed concrete to form completely around the housing, effectively sealing the unit.

Figure 43: Pool lights sleeves installed and hydraulic lines for Fastlane System. Make sure to protect all sleeves and plumbing from concrete spillage during the pour. If placement errors are made, replace the foam and glue in place. Strap and reinforce as necessary before the pour.

Take care when selecting products as many housings extended too far back into the foam preventing concrete from sealing the unit.. Note that each unit will need to be grounded to a steel rebar dowel pin with a solid copper line embedded in the foundation. When cutting the foam to install the niche housing try to center the light between two webs and between the horizontal rebar. This will make installation easier.

WIRING

Remember that the niche will need to be wired through the back of the housing. The connection must be watertight and the electrical conduit water proof. Seal the connection with silicone on both sides of the housing niche as well. Cut out a hole in the back side of the forms where the conduit exits the niche.

Seal the foam with foam adhesive to secure everything for the pour. Note that the electrical lines used for most pool lights are fully waterproof so no splices can be made. Make sure to protect the lines so that they are not damaged.

Figure 44: Pool return jets premade to correct length to match with pool finish.

PLUMBING

Before pouring your walls you identified the locations for any penetrations for plumbing. A sleeve was placed to provide an easy connection through the concrete pool wall or floor.

BuildBlock does not recommend running plumbing inside the concrete wall unless absolutely necessary. Placing pipe in the cavity of an ICF wall and pouring concrete around it has a tendency to create voiding and consolidation issues and is unrecoverable should the pipe fail.

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Plumbing is installed by creating chases in the foam and using foam adhesive to secure any pipes in place. Mark the route of the pipe on the foam before cutting. Keep in mind it isn't possible to install pipes with a diameter larger than 2½" due to the thickness of the foam.

Install all plumbing as required and follow all manufacturers recommendations as they apply.

Figure 45: Pool return jets pre-made and staged for installation.

Figure 46: Pool return jet installed.

Figure 47: Pool return jets installed and connected to supply line via central coupler passing through sleeve in pool wall.

Figure 48: Pool return jets installed, secured in place, and connected to supply line via central coupler passing through sleeve in pool wall.

Install any other supply lines that will be used in the pool such as filtration, sweepers, jets, or other lines. It is important to make any penetrations before the pour is completed. Plan accordingly, and use foam adhesive to fill any gaps created to prevent concrete leaking during the pour and prevent the sleeve shifting. Make sure everything is properly secured.

Figure 49: Pool return jets secured in place with foam adhesive and trimmed smooth for pool finish. Electrical light installed and ready for finish installation.

After the foam adhesive has completely cured use a flat saw to trim the foam flush with the rest of the wall.

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Figure 50: ICF walls and floor being poured using a line pump.

POURING THE WALLS AND FLOOR

PREPARING FOR THE POUR

The next step is to pour the walls and slab. This will be done all at the same time, so plan your concrete and crew accordingly. Before concrete arrives make sure that you have completed a pre-pour inspection. This will ensure that you have not missed any steps. When concrete arrives, time becomes limited to fix problems.

PRE-POUR CHECKLIST

1. Check all walls for completion including all strapping, foaming, and bracing.
2. Check all string lines for straight and plumb and use bracing to align walls in preparation.
3. Check all penetrations for completion and foam in any gaps.
4. Prepare and stage tools for the pour.
5. If a coping is being poured on top of the wall at a later point, stage rebar pins for the connection.

The concrete used in the walls and slab will typically be a 3,000-3,500 psi pump design mix. A 3/8" aggregate or less should be used. This allows for proper consolidation in the walls. The mix will be a maximum of a 6-inch slump. Adjust the mix as necessary. A slightly dryer mix at the bottom of the wall may work best to prevent overflow out of the holes that connect into the slab. Depending on the size of the job a line pump or boom pump is the recommended method for concrete placement.

Make sure that you have adequate help since the walls and slab are poured at the same time. Concrete finishing experience is necessary for the slab, especially since much of the floor will be sloped. The design, depth of the pool, and the design of the transition between the floor and wall will dictate the amount of finishing work required.

For more information on pouring an ICF wall review the BuildBlock ICF Installation Manual as well as other BuildBlock training materials. They go into much greater detail.

POURING STRATEGIES

Start pouring the walls moving at a lift height of 1.5 to 2 blocks high. Pouring only to this height with allow concrete to flow out of the holes that form the connection with the slab while preventing too much concrete from coming out.

Once a complete lift is finished move towards other items such as steps or benches while others on the team internally vibrate the walls lightly to ensure proper consolidation. Once

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steps at the lower level are poured continue to the slab. This will give the lower section of the walls time to slake or start setting up.

Figure 51: Pouring ICF pool walls.

Begin pouring the slab. Manage the slump for sections with significant slope. It is important to move quickly as the concrete in the walls should not sit for too long. Once the slab is poured move back to the walls. Pour in four-foot lifts until the top of the block is reached.

Internally vibrate each lift. If possibly slightly vibrate the top of the connection between the first and second lift. Be very careful not to over vibrate as this will cause the bottom layer of concrete to pass into the slab.

Hand trowel the top of the wall smooth and flush. If a coping is being poured later, install 3/8" rebar into the top of the wall. Check walls with a level and adjust all bracing to a string line before they harden up. Allow the walls and floor to set for a day or two to allow the walls and slab to harden and then proceed with the next steps.

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Figure 52: ICF pool with walls poured and waterproofed below grade. This pool uses Form-A-Drain an integrated stay-in-place footing form and perimeter drainage system.

GROUNDWATER MANAGEMENT

WATERPROOFING THE WALLS

If you are interested in building a "Mother Nature" proof pool or live in an area with an especially high water table you may want to consider waterproofing the ICF wall and installing French drains. Keeping water away from the pool will prevent long term damage. ICF's are not a waterproof material and over time water could permeate through the wall and get behind finishes. This can cause damage to the plaster and tile surfaces.

This is no different than ground water seeping into the gunite of a traditional pool. Waterproofing can be done the day after the pour while the concrete is still curing. This is an optional step. The goal is to shed water around the pool or to a perimeter drain system depending on volume.

For more information on this subject please reference the BuildBlock Comprehensive Guide to ICF Waterproofing, or the PolyWall Home Stretch Membrane instructional manual. PolyWall is BuildBlock's preferred vendor for ICF waterproofing materials.

Prepare the site for installation by cleaning the footing and walls. All surfaces should be clean, flat and clear of debris. All membrane sheets will be cut into vertical sheets and installed in a vertical fashion. Measure the wall including the footing, as the waterproofing should extend over the edge of the footing. This creates a drainage plane that passes water beyond the edge of the footing to your drain system.

Using a paint roller apply the Shurtac primer. Roll the entire wall area and a few inches onto the foundation with primer. The primer should take only a short time to set up depending on site conditions such as humidity, temperature and sunlight. The primed surface should have a dry tacky feeling when ready. Do not prime the wall and let set overnight. The primer needs to be covered within a few hours.

Align and apply the Home Stretch Peel 'N Stick Membrane vertically in sections of 8 feet in length or less, starting from the lower foundation wall base and rising to the top using the 6-inch overlap, shingling down on each ply of membrane. On walls higher than 8 feet, apply two or more sections of Home Stretch Peel 'N Stick Membrane with the upper section overlapping the lower.

Use heavy hand pressure while smoothing out the Home Stretch Peel 'N Stick Membrane surface as it's applied; and use a hard, narrow, hand-held roller to firmly adhere the material for a complete bond as it is placed on the vertical surfaces. When continuing the Home Stretch Peel 'N Stick Membrane materials above grade to reach the top of foundation wall, apply Poly Wall Aluma Flash PLUS or metal flashing over all of the Home Stretch Peel 'N Stick Membrane above grade, with its lower edge a minimum of four (4) inches below grade, to protect the installed Home Stretch Peel 'N Stick Membrane from UV exposure beyond its 30 day limit.

Once the water proofing is in place, a French drain system can also be installed. An excellent product to consider is Form-A-Drain. Form-A-Drain is an integrated forming system for footings that stays in place and provides perimeter drainage. See product information and installation methods on our website.

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INSTALLING FRENCH DRAINS

If not using Form-A-Drain, traditional drain tile may be in stalled around the perimeter of the pool to a sump or a gravity drain to daylight if possible. The goal is the shed ground and surface water away from the pool structure so that no water enters the wall system, potentially causing damage to the tile and other finishes.

Figure 53: IMG_6478.JPG

BACKFILLING THE POOL WALLS

The time to backfill may vary depending on preference. This can be done prior to plastering. Remember that all plumbing and wiring will need to be completed prior to backfill. Often it is important to test this equipment for leaks before covering. Plan accordingly.

Figure 54: IMG_6884.JPG

BEFORE BACKFILLING

Before backfilling make sure the poured walls and slab have met the required cure time. The time that should be noted is on Detail PE2 item 9 in the Pool Engineering manual. Fourteen (14) days is the minimum required with light equipment and twenty-one (21) days is required if using heavy equipment.

Note the use of surcharge tables in the engineering manual which means heavy equipment should not get close to the side walls or used for compacting the soil. Too much weight on unsupported walls could cause a collapse. See notes on detail PE3 surcharge tables. Follow these instructions when back filling.

Figure 55: 20190327-mike-garrett-pool-574.psd

While backfilling the pool walls make sure the soil is adequate for this purpose. Gravel or non-expansive soil is best. Clay soils can over expand when wet and cause damage. Gravel is self- compacting. Soil will require layered compaction. Talk to a local engineer regarding backfilling materials if you have questions about fill material.

BACKFILLING

When backfilling make sure to protect the water proofing if applied. A drain board can be used if needed. Gravel tends to damage the membrane. Start placing soil or gravel in layers about a foot at a time. Compact soil with light tools or hand equipment. Gravel is self-compacting. You may use a skid steer loader or other equipment to place the material around the pool but take extreme care to not get on top of the backfill material and never compact the soil with the wheels of the loader. Note adding a small amount of water is helpful when backfilling with soil as it helps compaction.

Figure 56: IMG_7021.JPG

Finish backfilling being careful not to damage any of your water and supply lines going to the pool. Keep all plumbing lines level and hand fill around these areas so as not to create damage.

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Figure 57: Complex ICF pool finished with BuildCrete Pool Plaster and painted with an epoxy colored paint.

FINISHING AN ICF POOL

SETTING TILE

Setting the tile is a part of the construction process that takes time and care. Tile is often a long-term maintenance area for most pool owners. If you are a DIY pool builder working by yourself, you may want to consider using tile to break up areas of your pool into sections. This gives natural stopping points for plaster, as the BuildCrete process is labor and time sensitive.

BuildCrete Pool Plaster is the recommended base for all tile applications. It will be floated directly onto the EPS surface and forms a mechanical attachment with the foam as it cures. Few if any other materials do this well.

Figure 58: 20171007-mike-garrett-pool-525.psd

TILE BASE PREPARATION

Often tile is applied at the base of the coping at the waterline. Begin by ruffing up the surface of the foam with a rasp and apply a thin base coat of BuildCrete. Lay fiberglass mesh directly into the BuildCrete. Once the mesh has been troweled in immediately cover with another coat of BuildCrete. Tile can be laid directly into the BuildCrete, or this can be left to cure and tile later set with a thinset adhesive.

Figure 59: Base installed at top and bottom to ensure level.

To ensure a clean level edge a 1x4 can be installed at what would be the base of the tile allowing the BuildCrete to be troweled at an exact level. If wall heights are not level, heights can be slightly adjusted at this time, especially if a poured coping is being used later. Set the 1x4 with a

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laser level if available. If a thinset is being used, wait for the BuildCrete to cure and then set the tile.

Figure 60: Base installed on top and bottom of curved form to ensure level for tile.

Take note of the temperature, humidity, and direct sunlight when applying BuildCrete Pool Plaster. In direct sunlight on warm days, shrouding should be used to provide a longer working time for the pool plaster. Adding more water to moisten the mix is not recommended and will degrade the strength of the finish.

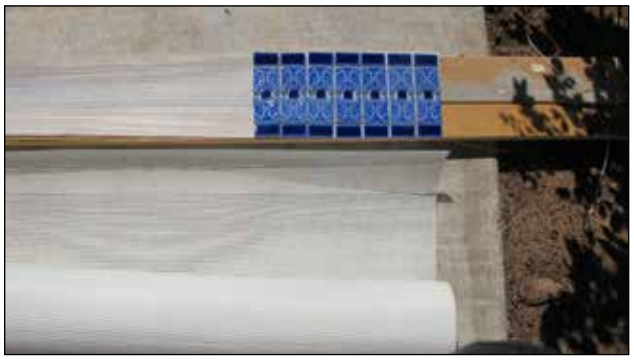

Figure 61: Use a template to cut the mesh for the BuildCrete Pool Plaster.

Figure 62: Stage all materials before applying base and setting tile.

Figure 63: With tile set prepare to insalled the foam floor to wall cove transition.

Figure 64: With the cove transition and pool cleaned for finish installation, stage mesh and other materials as needed.

All other tile can be set in a similar fashion. BuildCrete adheres well to concrete, so any tile on the floor can also be applied in this manner. Take time to layout and stage all materials before you begin. This will help ensure the final result looks clean and professional. If the BuildCrete is curing too quickly use a spray bottle with water to mist to keep moist. This can give you a few more minutes of working time. Only mix the amount of plaster that you plan on using immediately.

Figure 65: 20190327-mike-garrett-pool-573.psd

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Figure 66: 20181101-mike-garrett-pool-542.psd

PLACING AND POURING THE POOL COPING AND POOL DECKING

The BuildBlock test pool used a poured coping with a blended white concrete. This step was completed prior to plastering and after the tile was installed. Pouring a secondary coping allowed a slight adjustment to wall heights and the ability to set the tile at a perfectly level height around the entire pool. The chosen forming system was a foam system from Stegmeier LLC that gave a rounded edge and 3.5″ of height above the wall. There are multiple coping styles. This section will apply most directly to a poured coping installation.

Figure 67: Stegmeier forms are installed and tied to the embedded rebar. After coping is poured the wire breaks away and is left embedded hidden in the coping.

REINFORCING COPING

Bend the rebar placed in the top of the wall into the middle of the coping height. A hickey bar is a useful tool for making these bends. The Stegmeier product comes 112-feet per carton. Begin to attach the product and further tie the product off to the bent rebar. Follow the Stegmeier installation instructions. There are many installation videos on YouTube that may also be very helpful.

Figure 68: Instructions for installing the Stegmeier pool coping forms with tile track.

Figure 69: The tile track provides a break between the poured coping and tile to prevent any damage from expansion and contraction.

Figure 70: The Stegmeier wire tie is scored to break away after the coping is poured.

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Figure 71: Stegmeier forms are installed and tied to the embedded rebar. After coping is poured the wire breaks away and is left embedded hidden in the coping.

Figure 72: The Stegmeier pool coping forms are installed, wired, reinforced with tape and strapped where needed. Tools are laid out to screen and finish the coping.

Figure 73: The Stegmeier pool coping is poured using shovels and a concrete hopper. Pour the coping and finish quickly, but fill gently with a high slump concrete and consolidate wel for best results.

When pouring the coping take time to not put too much pressure on the forms. Shoveling concrete is the preferred method. Trowel the top and bring to a true finish. Once the concrete is starting to set up, carefully remove the forms so that the sides of the coping can be finished. Do this carefully and timing will be essential. Removing too early can cause damage and removing too late will not give adequate time to finish the edges.

Figure 74: The pool coping is poured and forms stripped. Score with a concrete saw every 24"-36". Fill the seam with pool plaster, caulk, or another material.

A simple technique for smoothing the concrete on the edge of the coping is to take plastic material such as visqueen and fold it over so it has some rigidity. Wet it slightly and use to polish the edges of curves with a slight pressure. This will polish the edge, removing rough spots and deliver a nicely finished edge.

Figure 75: A skim coat is first applied, then the 11oz. mesh embedded and the material is troweled or sprayed to its full thickness and finished.

Figure 76: Additional BuildCrete matertial is used to embed the mesh completely and build up to the finshed thickness.

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Figure 77: Continue working the material until the full thickness and desired finish is achieved.

Figure 78: Apply the mesh in sections on curved walls, overlapping as needed. Build up to the desired thickness and finish.

Figure 79: Apply the mesh in sections on curved walls, overlapping as needed. Build up to the desired thickness and finish.

Figure 80: BuildCrete built up to the desired finish before final troweled finish.

Figure 81: BuildCrete built to final thickness as final smooth finish applied.

BUILDING UP BUILDCRETE

Build up BuildCrete Pool Plaster to 1/4" on the sides of the pool and 3/8-1/2" on the pool floor. This will ensure there is sufficient material to provide the required strength. Use the 11oz mesh in all areas.

BuildCrete Pool Plaster comes in 75lb. bags. Typical coverage is 30 square feet on the walls at 1/4" thickness and 25 square feet on the floor at 3/8-1/2" thickness.

Figure 82: BuildCrete used as a tile bed on pool exterior.

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FINISHING THE POOL

There are several options when plastering an ICF pool. Note that only a few materials attach well to the EPS foam. BuildBlock recommends three different strategies.

1. Use BuildCrete Pool Plaster.
2. Use a vinyl liner. (should discuss basics on vinyl linter installation)
3. Use BaseCrete and then finish with other approved pool finishes such as tile, marbleized plaster, SiderCrete or Pebble Tec.

Each installation method has its pro's and con's. Seek out expert advice on this subject as finishing materials for ICF pools is not well researched.

The BuildBlock test pool utilized the first method: BuildCrete Pool Plaster. We were extremely happy with the results and at the writing of this manual the coating has performed flawlessly for more than two years. We strongly believe that the BuildCrete Pool Plaster is the superior choice. BuildCrete pool plaster can be colored using a variety of different concrete colorants. We purchased coloring product from Direct Colors, Inc.

BUILDCRETE POOL PLASTER APPLICATION GUIDELINES

BuildCrete Pool Plaster is suitable for pool applications as long as the following installation methods are followed:

- Concrete bottom is clean and sealed with an acrylic bonder prior to application.
- A foam or cement cove is installed around the bottom edge providing a curved transition.
- The coating on the concrete is 3/8 of an inch thick.
- The coating on the ICF block is 1/2 inch thick.
- A minimum of our 11oz mesh is utilized.
- Proper installation methods are used including providing sufficient drying time for BuildCrete Pool Plaster to cure. Typically 5-7 days before any water is added to the pool.

The coating can be either painted, covered in colored pool plaster or left natural once the BuildCrete Pool Plaster has cured.

BUILDCRETE POOL PLASTER COVERAGE

The BuildCrete Pool Plaster Installation document can be found at the BuildBlock website. This document covers the installation in more depth and gives information about expected coverage. As a general guideline each bag of 75 lb. plaster will cover 42 sq.ft. at 3/16" thick, 26.5 sq.ft at 1/4", and 21 sq.ft at 3/8" thick. Most pool applications will require the thicknesses just mentioned. A 3/8" application worked very well for the test pool.

Figure 83: BuildCrete Pool Plaster built up to final thickness and troweled smooth.

Figure 84: BuildCrete Pool Plaster built up to final thickness and troweled smooth.

Figure 85: Sectioning the pool for finishes will help ensure a quality finish and prevent overworking the plaster.

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Figure 86: BuildCrete Pool Plaster built up to final thickness and troweled smooth.

PREPARING THE WALL SURFACE

Before beginning to plaster ensure that the EPS wall is smooth and flat. Any areas that were cut away for plumbing or wiring should be filled with foam glue and leveled flush with the wall. If a foam transition is being used between the wall and floor, install this now using foam glue. Cover the pool tile with tape and any plumbing or wiring finishes that need to stay clean.

MIXING & COLORING BUILDCRETE POOL PLASTER

A two-bag mixing machine is the proper size for a small team of 1-3 workers. The BuildCrete pool plaster has a short working time so do not mix up too much material at once. The material application is similar to a synthetic stucco. A stucco contractor should be able to handle the application with very little instruction.

To color the material pre-bag the colorant in pre-measured amounts per bag of BuildCrete. This allows for better control of the color across the pool. The mixer can be rinsed out between each load for more accuracy.

APPLYING BUILDCRETE POOL PLASTER

Rough up the EPS foam with a rasp before installation. Apply a scratch coat and then lay in the fiberglass mesh. Finish immediately with a top-coat and smooth over. All of these steps should be done with the buildcrete staying wet and workable.

A mister can be used to keep the material more workable for a longer period of time. The plaster can also be built up to a larger area of thickness to match the tile edge. Build up these areas to give a flush finish. If working in direct sun on a warm or hot day or in windy conditions, consider shrouding to protect the plaster while it's being installed to provide a longer open time and a more comfortable working environment.

If working alone, segment this process. Use areas of tile as starting and finishing points. Do not expect to cover large areas if working alone. Plan accordingly.

FINISHED RESULTS

The photos below show the pool rinsed two years after initial construction. The coping, pool plaster, tilework and plumbing have performed without problems. This pool is emptied in the winter.

Figure 87: BuildCrete finished ICF pool with tile ready for the pool season.

Figure 88: BuildCrete finished ICF pool steps, plumbing and lights. Ready for the pool season.

Figure 89: Smooth BuildCrete Pool Plaster wall finish.

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Figure 90: Finished ICF pool skimmer finished with BuildCrete Pool Plaster and tile.

Figure 91: Finished ICF pool skimmer finished with BuildCrete Pool Plaster and tile.

Figure 92: HGQI3780.JPG

Figure 93: HJUH3717.JPG

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Figure 95: Place pool equipment in a safe area, sheltered from weather with enough space to maintain all equipment and eliminating any hazards.

CONNECTING POOL EQUIPMENT

Finish the pool by connecting any remaining plumbing or electrical equipment. Much of this can be completed prior to plastering if desired.

Many pool plumbing systems have unique applications and connecting pool equipment is outside the scope of this construction manual. There are many online guides and resources available to help you orient and connect the equipment for your specific system. Follow all manufacturer recommendations. This is one of those areas where having a relationship with a local pool supply company can be very handy.

In our research we discovered the website Expert Pool Advice - Swmming Pool Steve. This site has a wealth of information and resources that you should find very useful. http://swimmingpoolsteve.com

Figure 96: All electrical should be installed in appropriate weatherproof housings and be accessible in an emergency.

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Figure 97: Make sure all plumbing is secured and protected against the environment and is accessible for maintenance as needed.

Figure 98: Place all controls so they are easily accessible.

Figure 99: The Endless Pool's Fast Lane swim-in-place system.

CONCLUSION:

We hope that this manual was helpful. Please share photos of your pool project. If you find tips or tricks you think we should include in this manual or in other materials, please share them. We like to learn about new processes that were successful and regularly update our manuals accordingly.

Thank you for using our products and being one of our fine customers. Please share us with all your friends.

Thanks from all us at BuildBlock.

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APPENDIX

APPENDIX A: ICF POOL CONSTRUCTION STEPS

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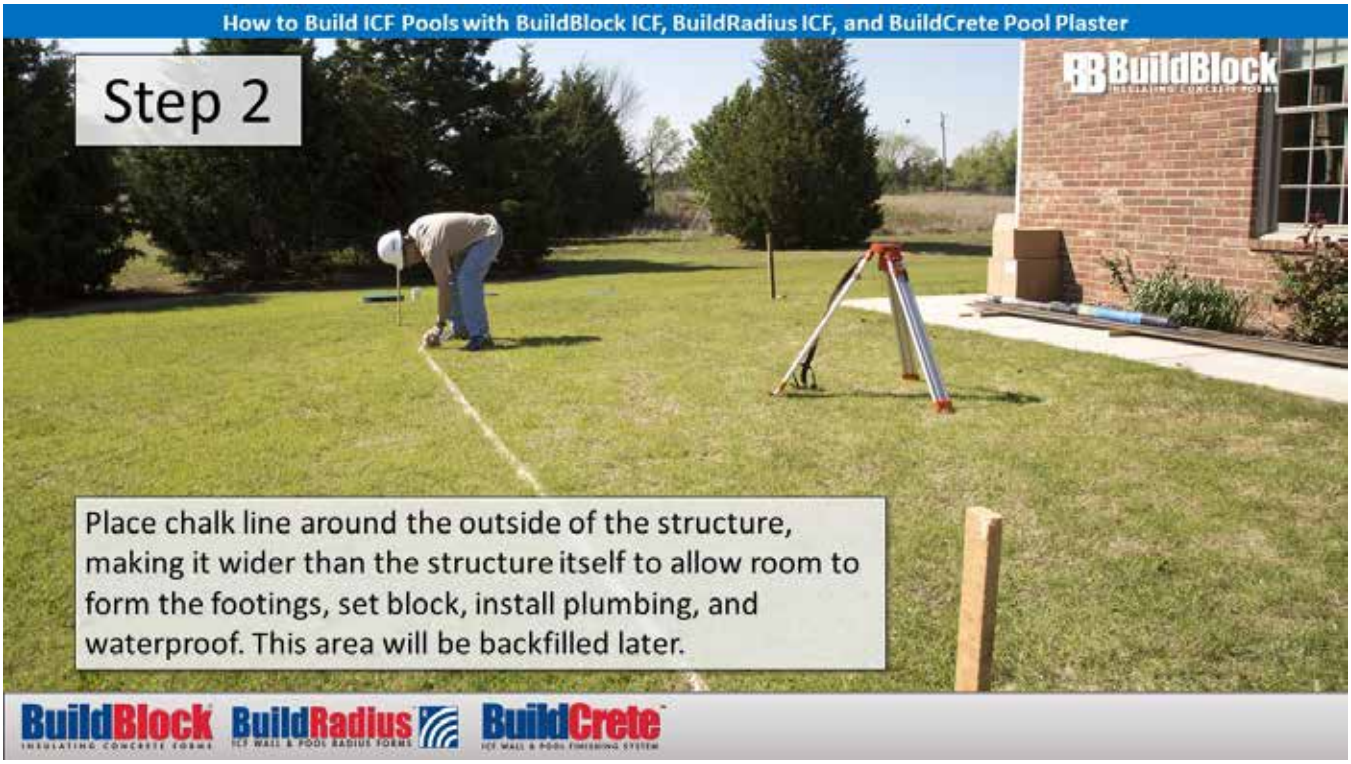

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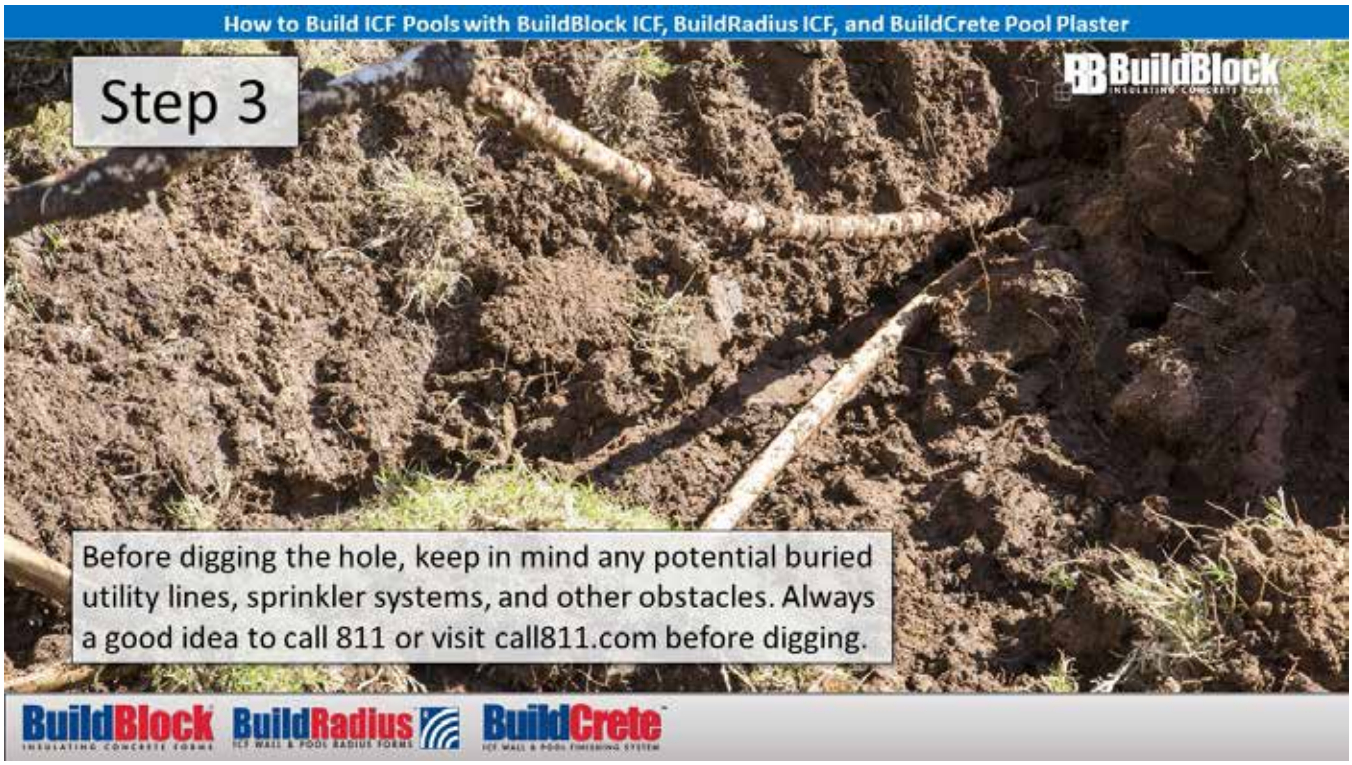

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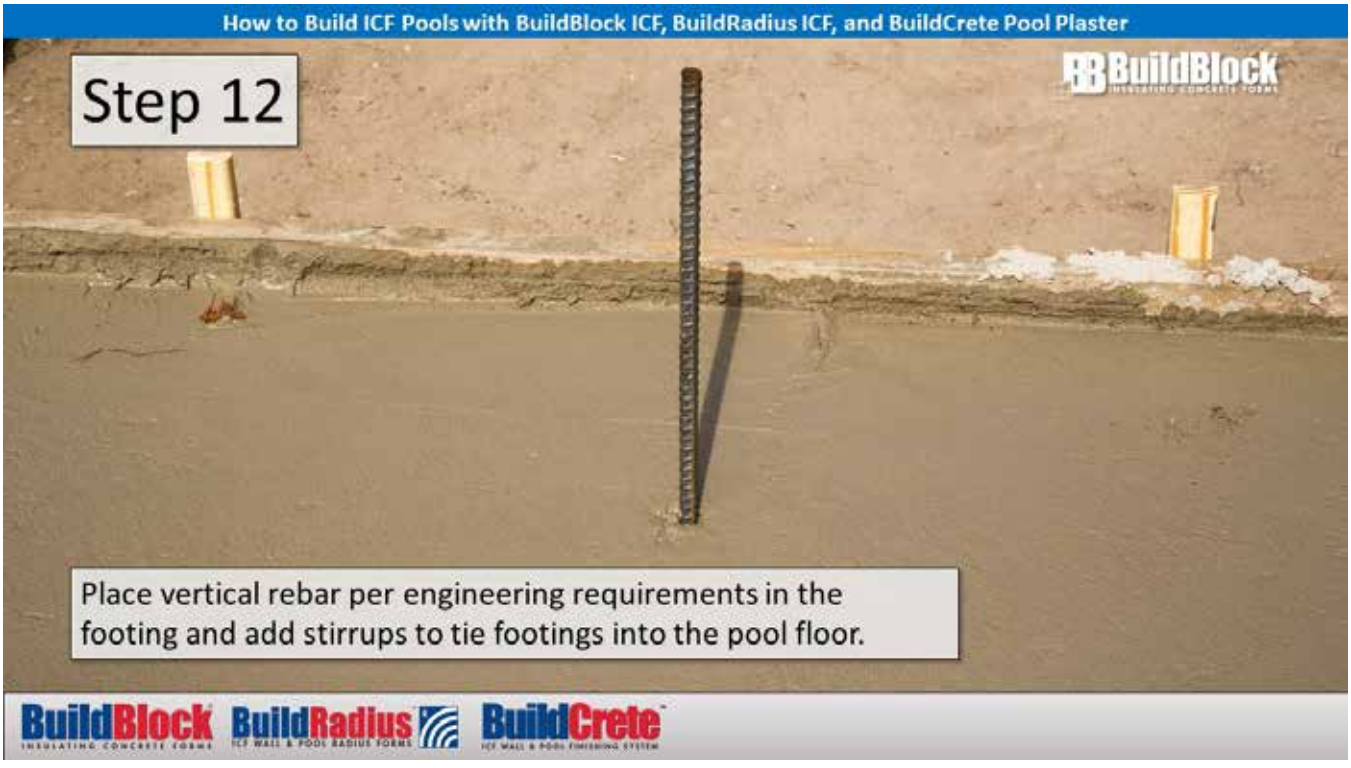

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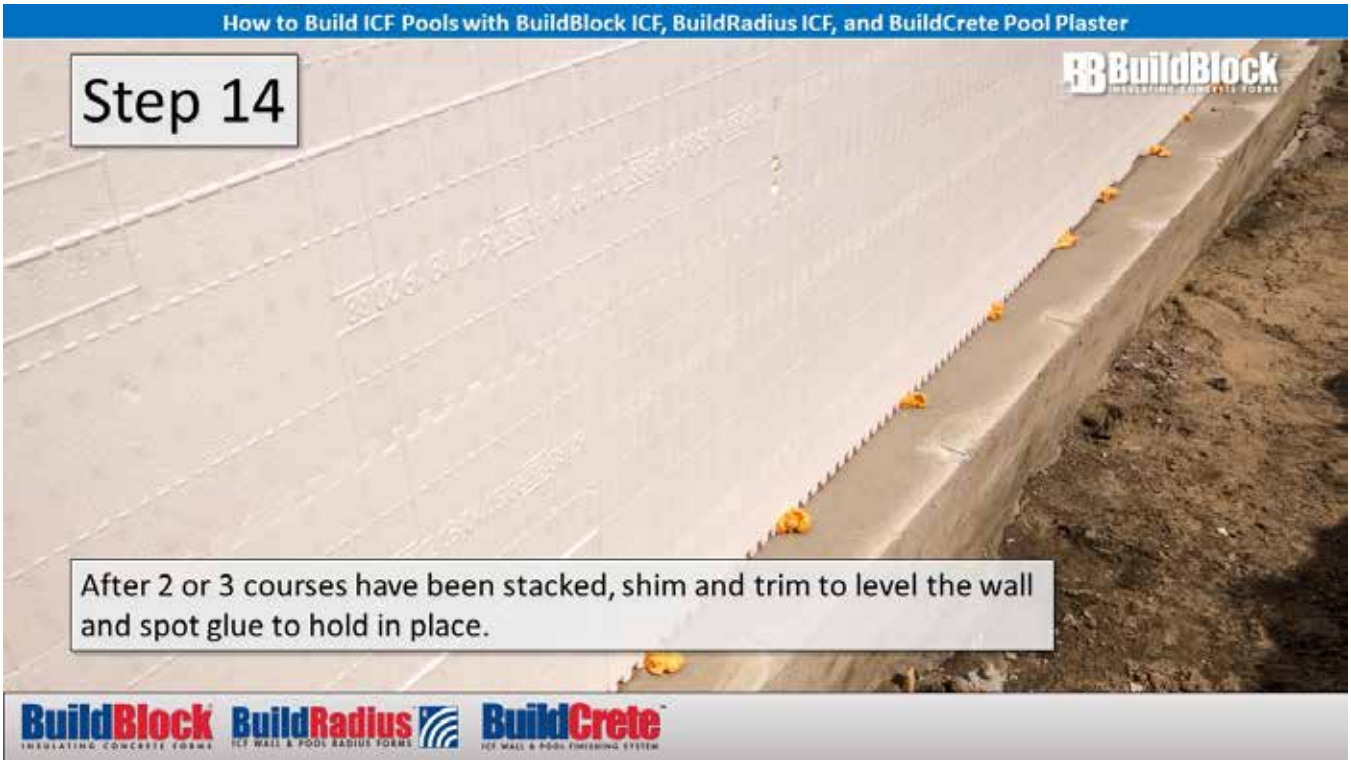

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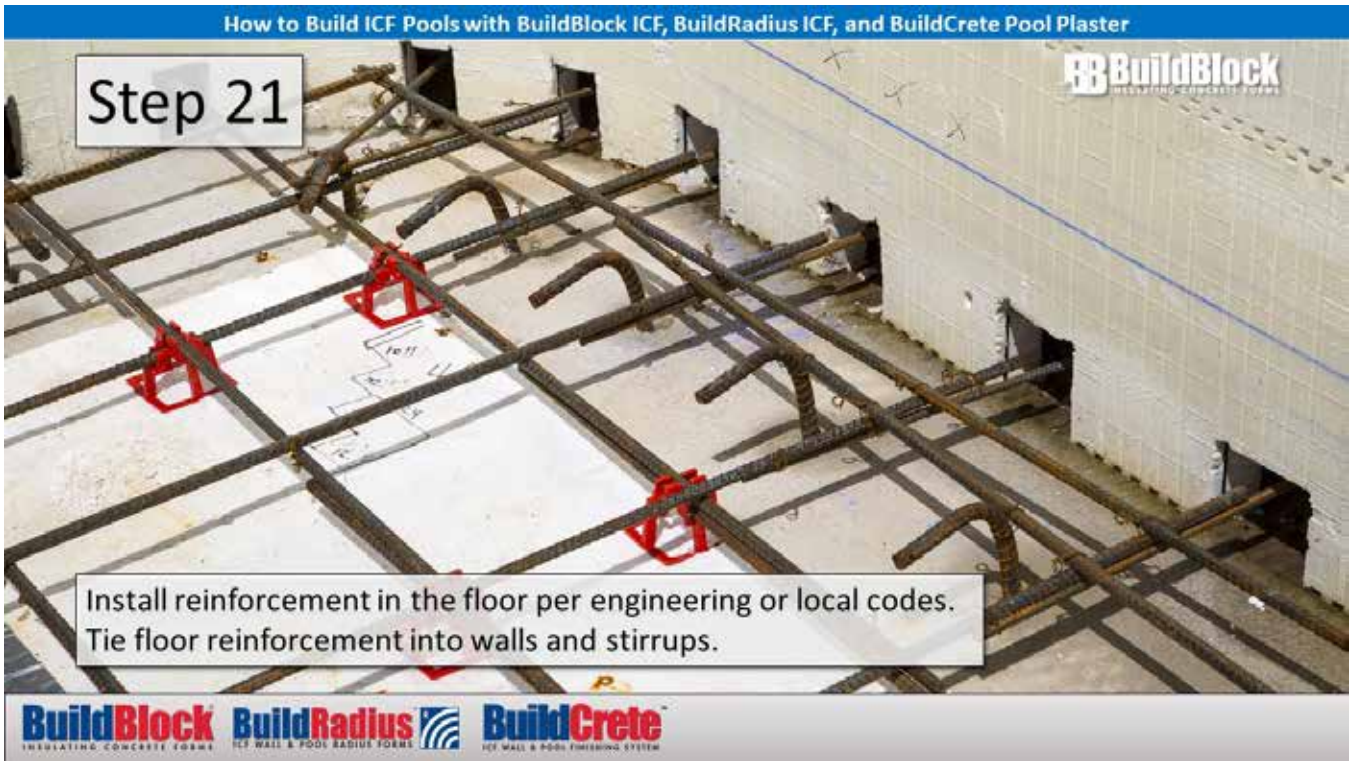

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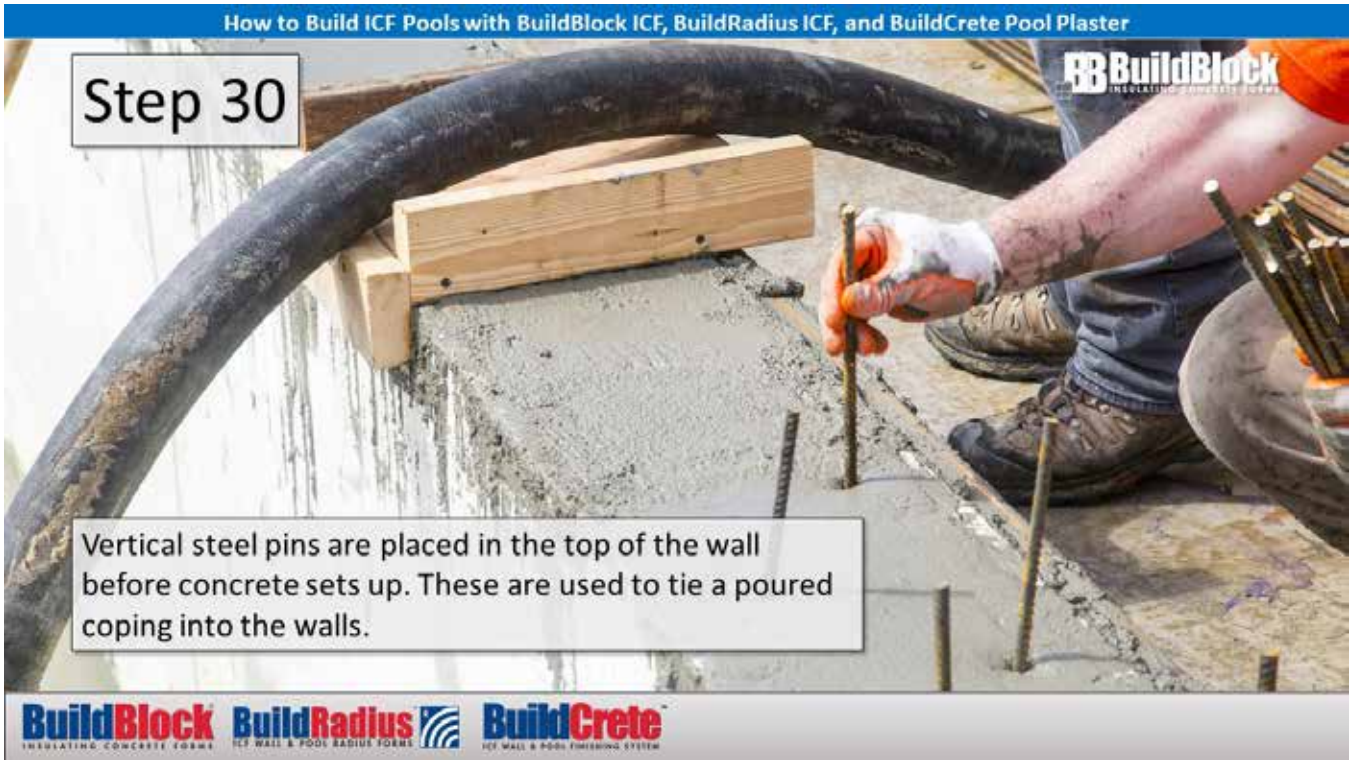

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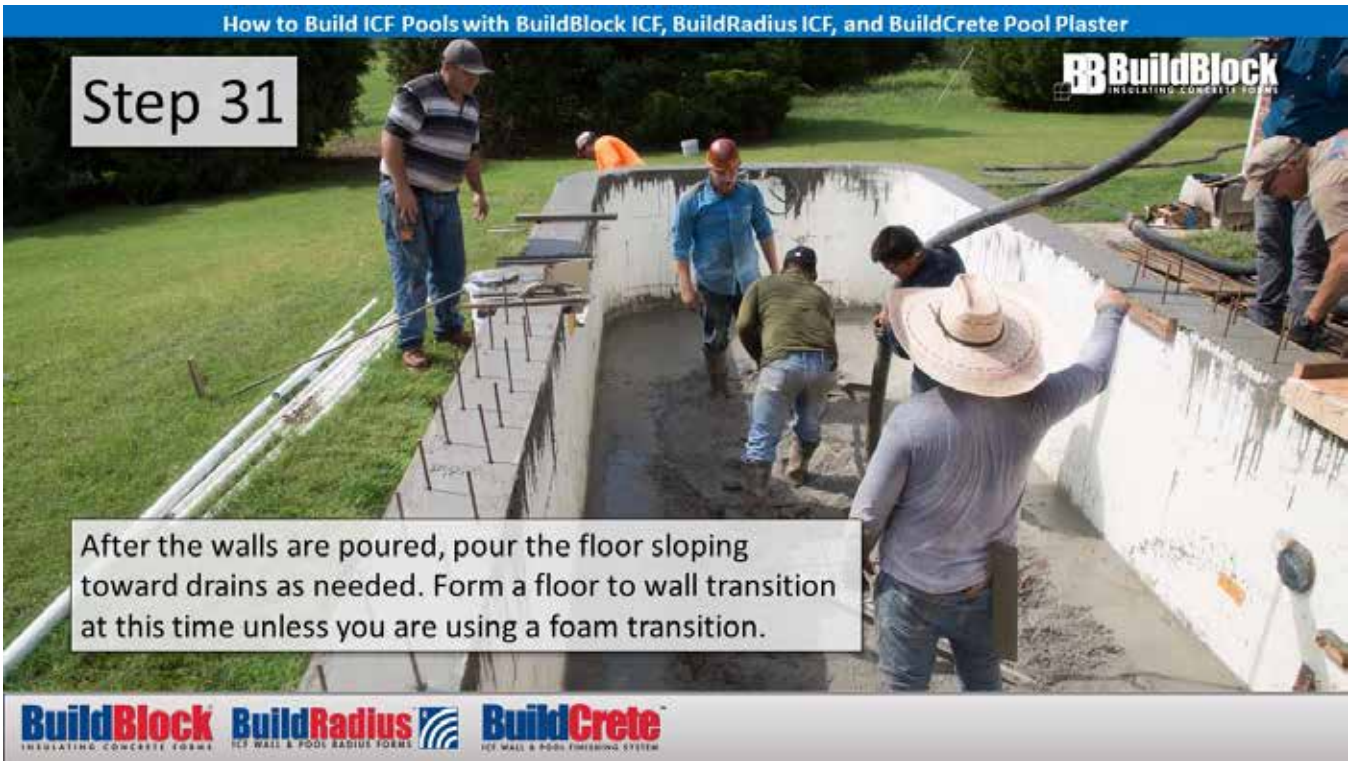

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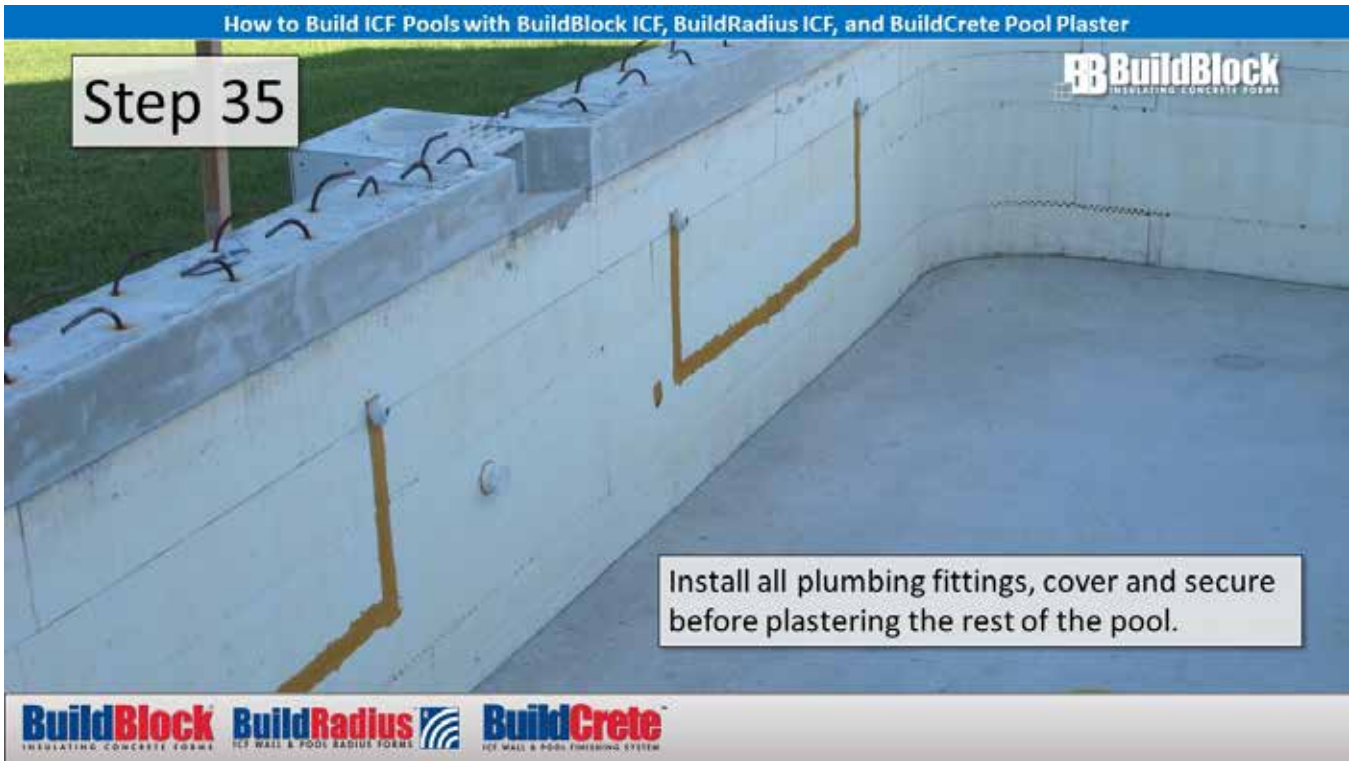

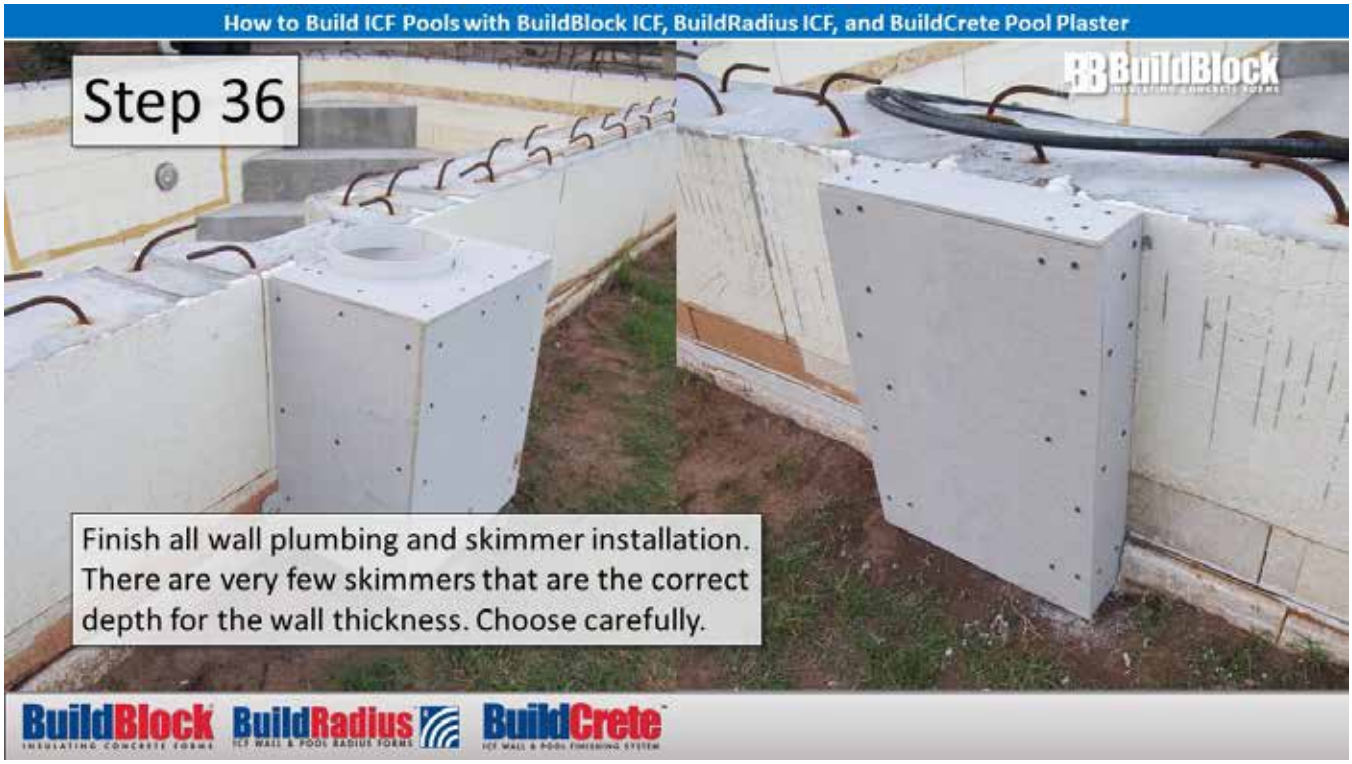

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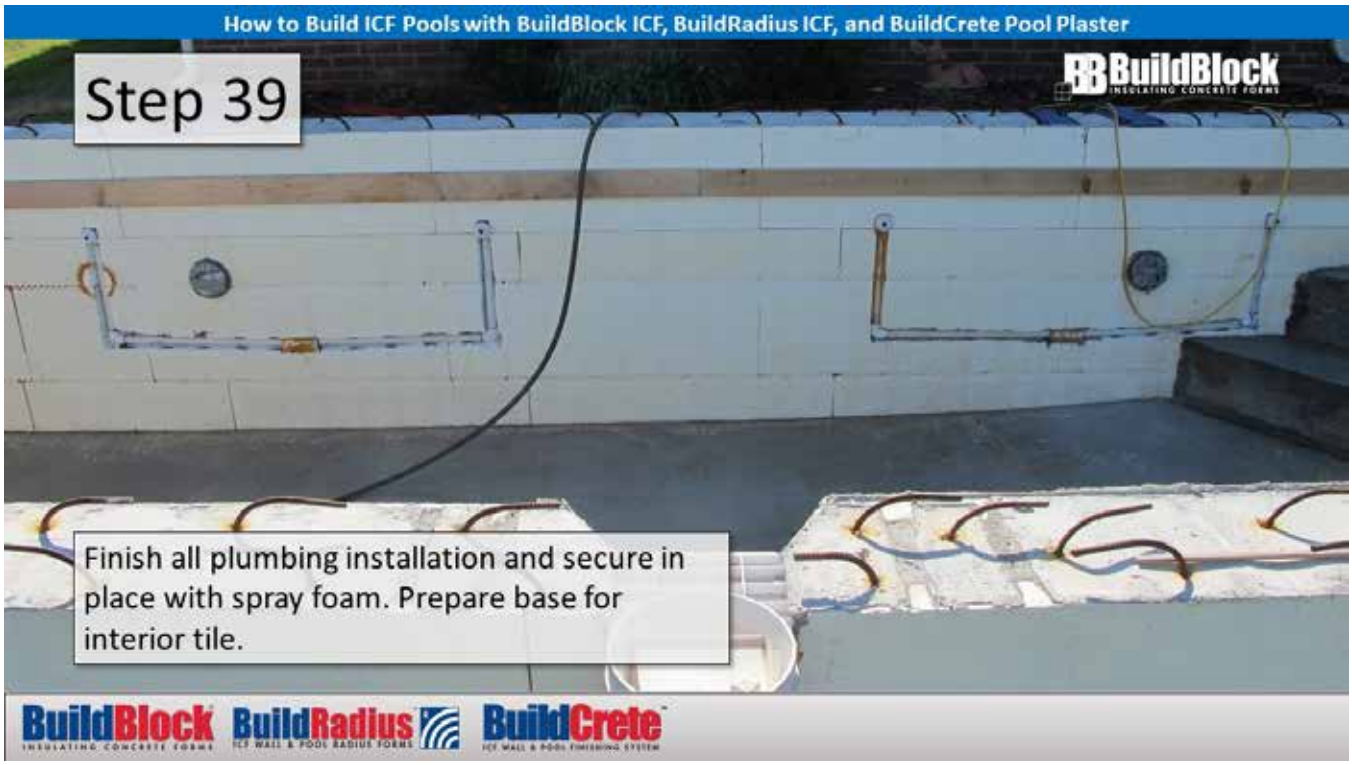

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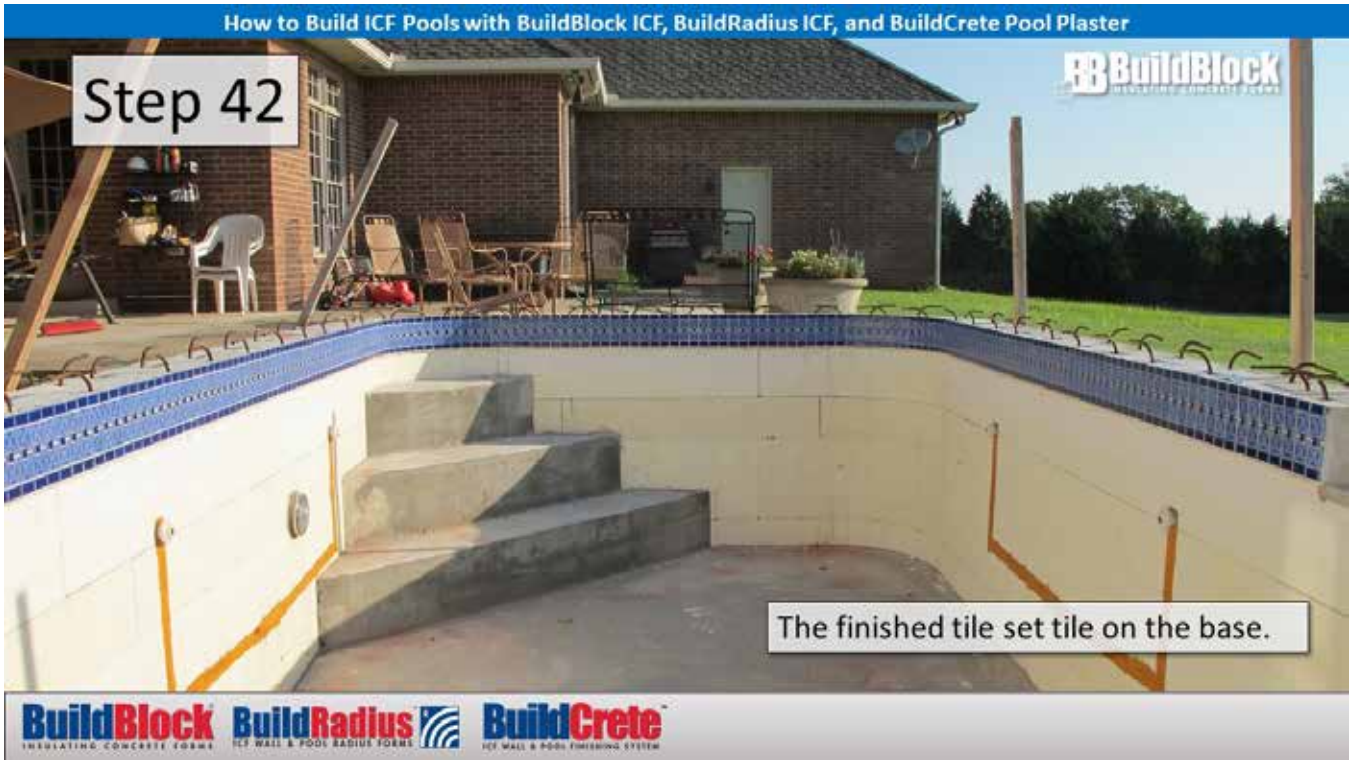

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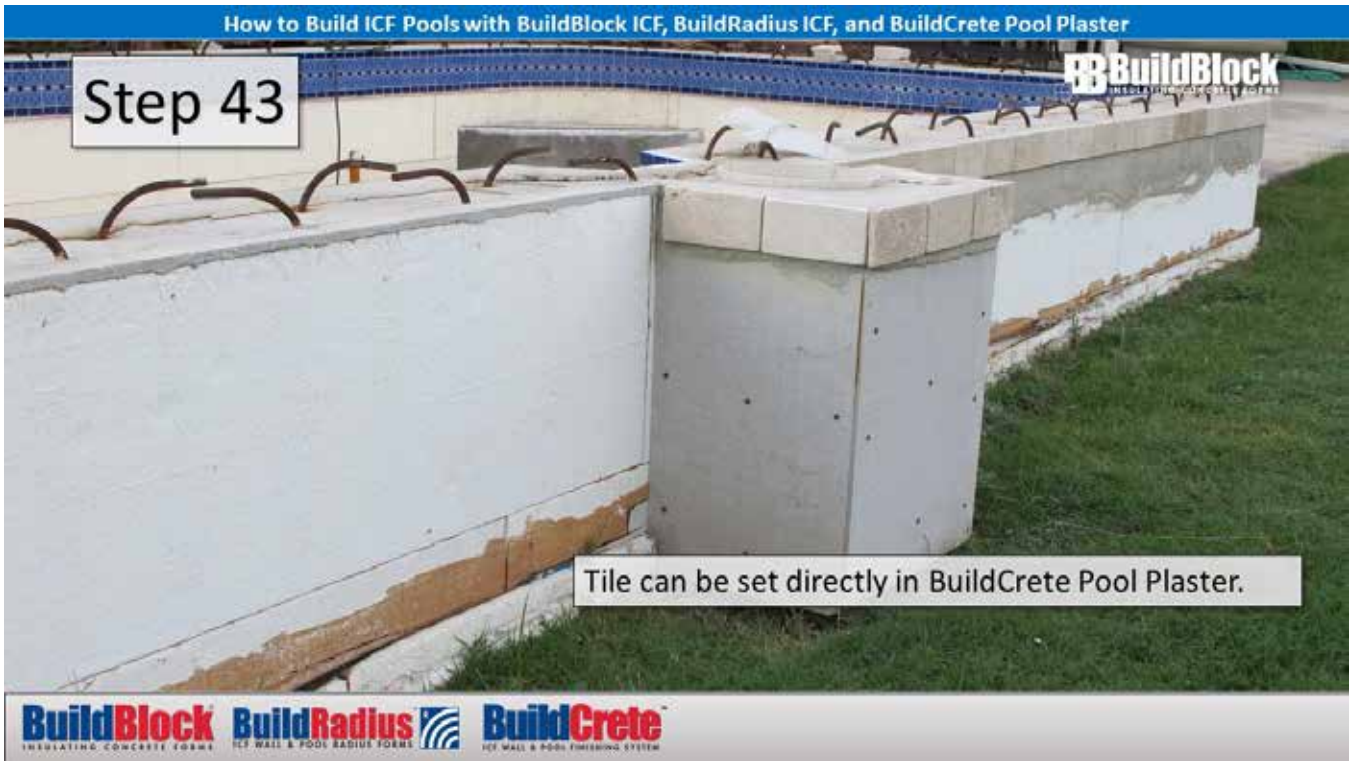

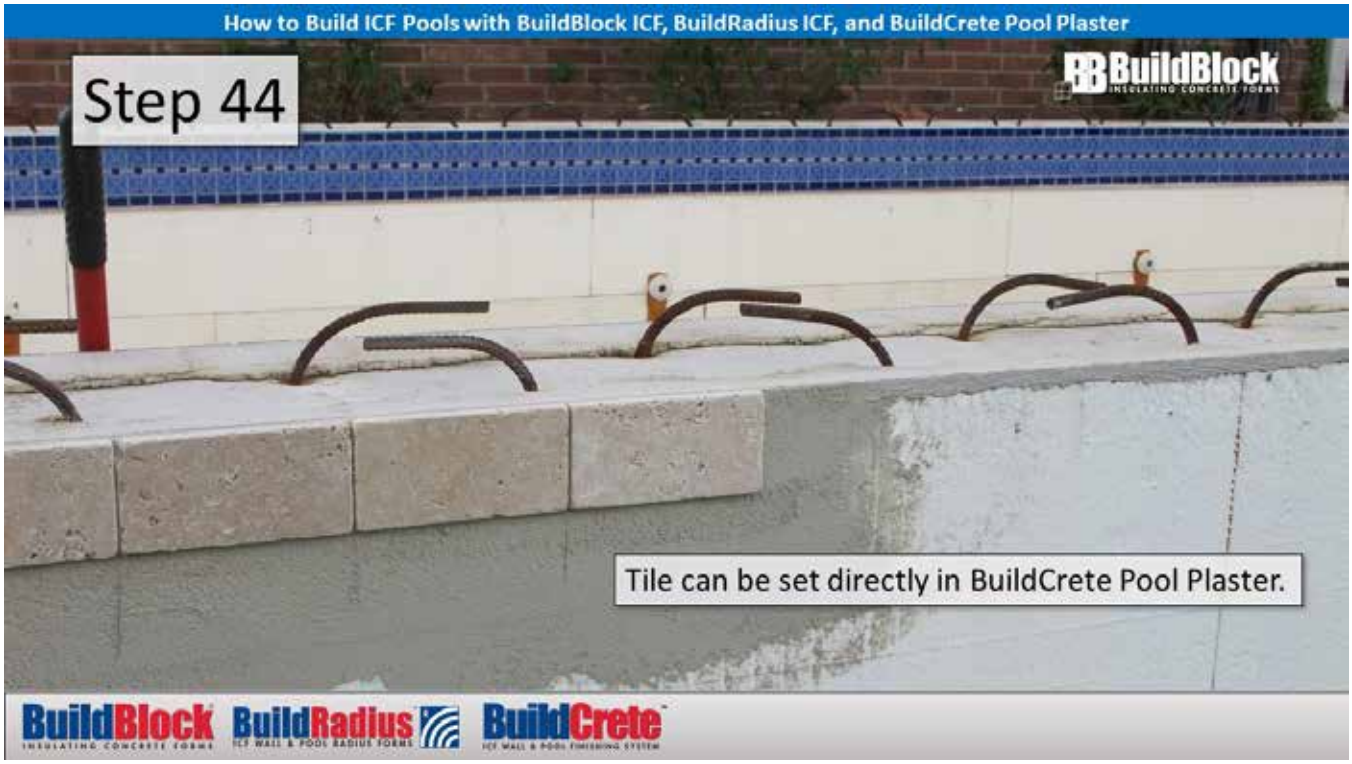

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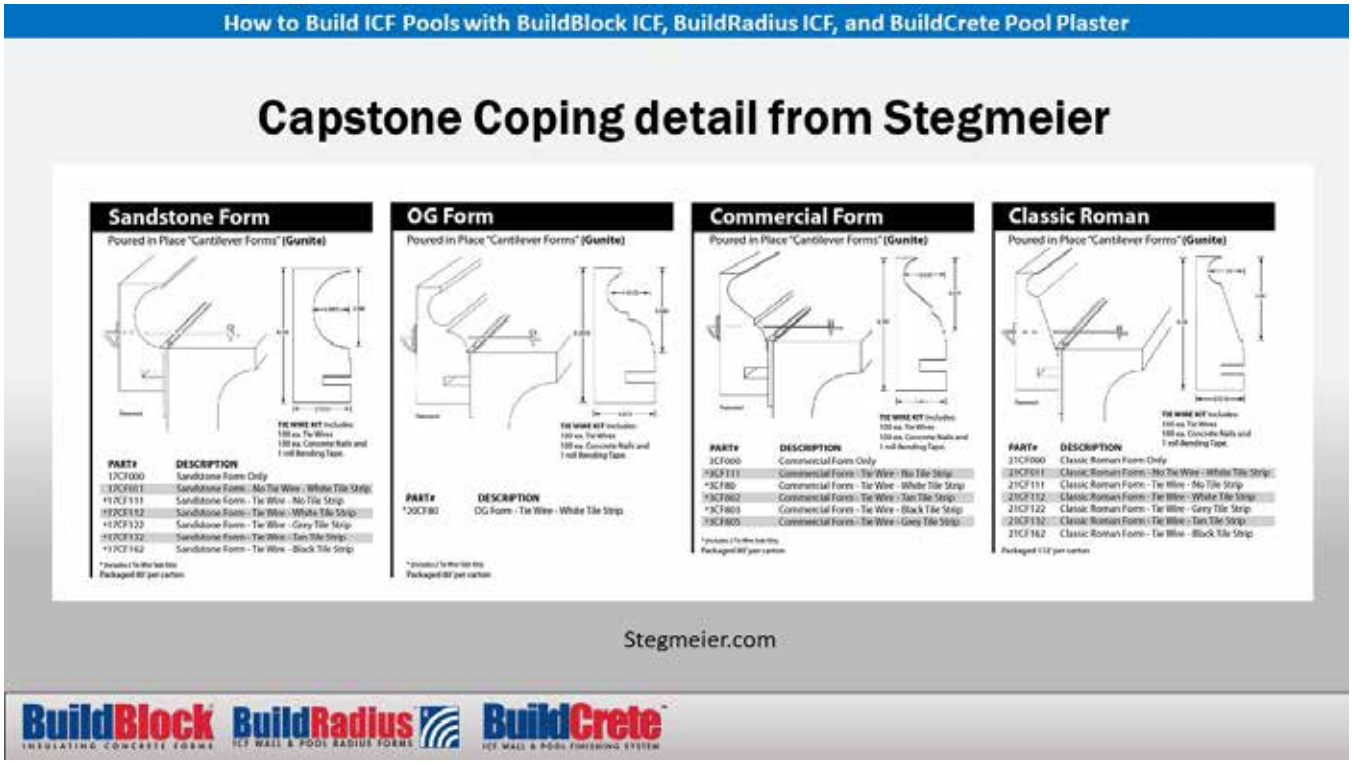

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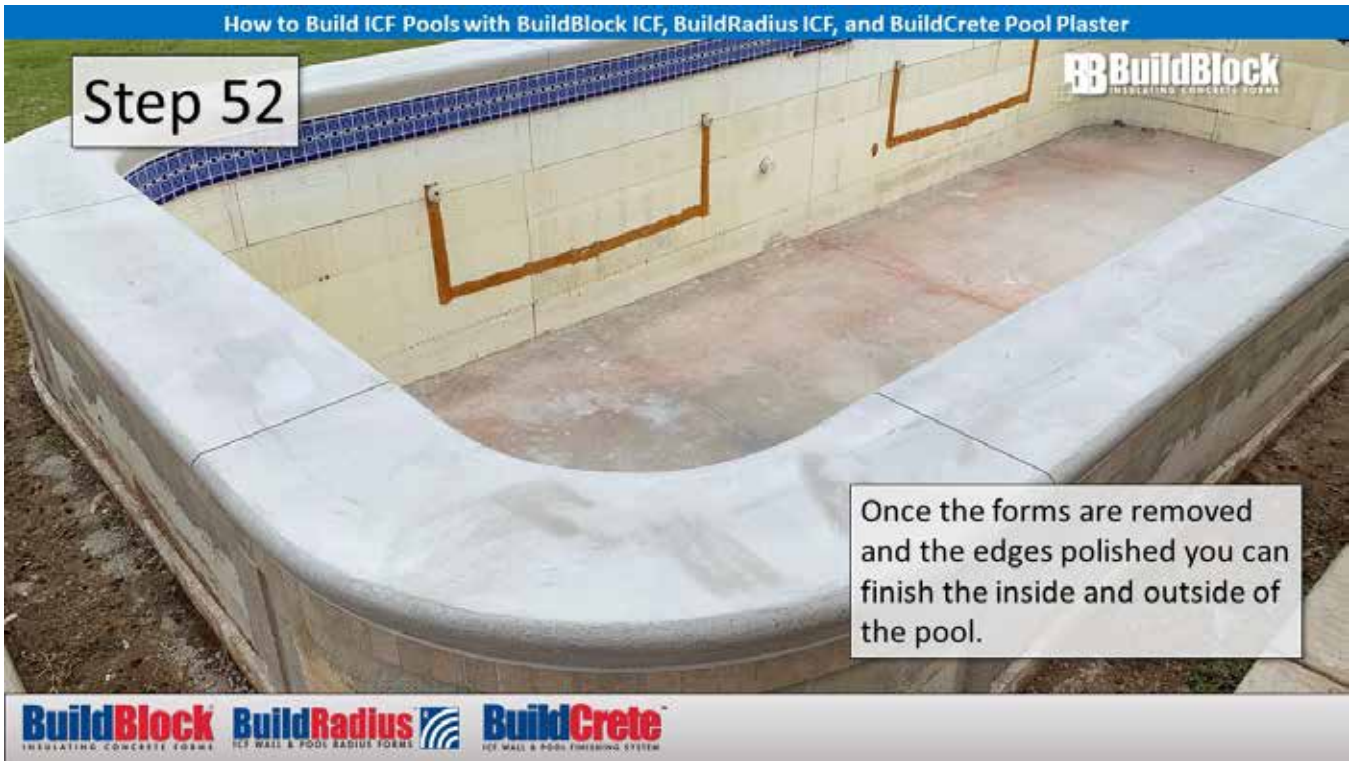

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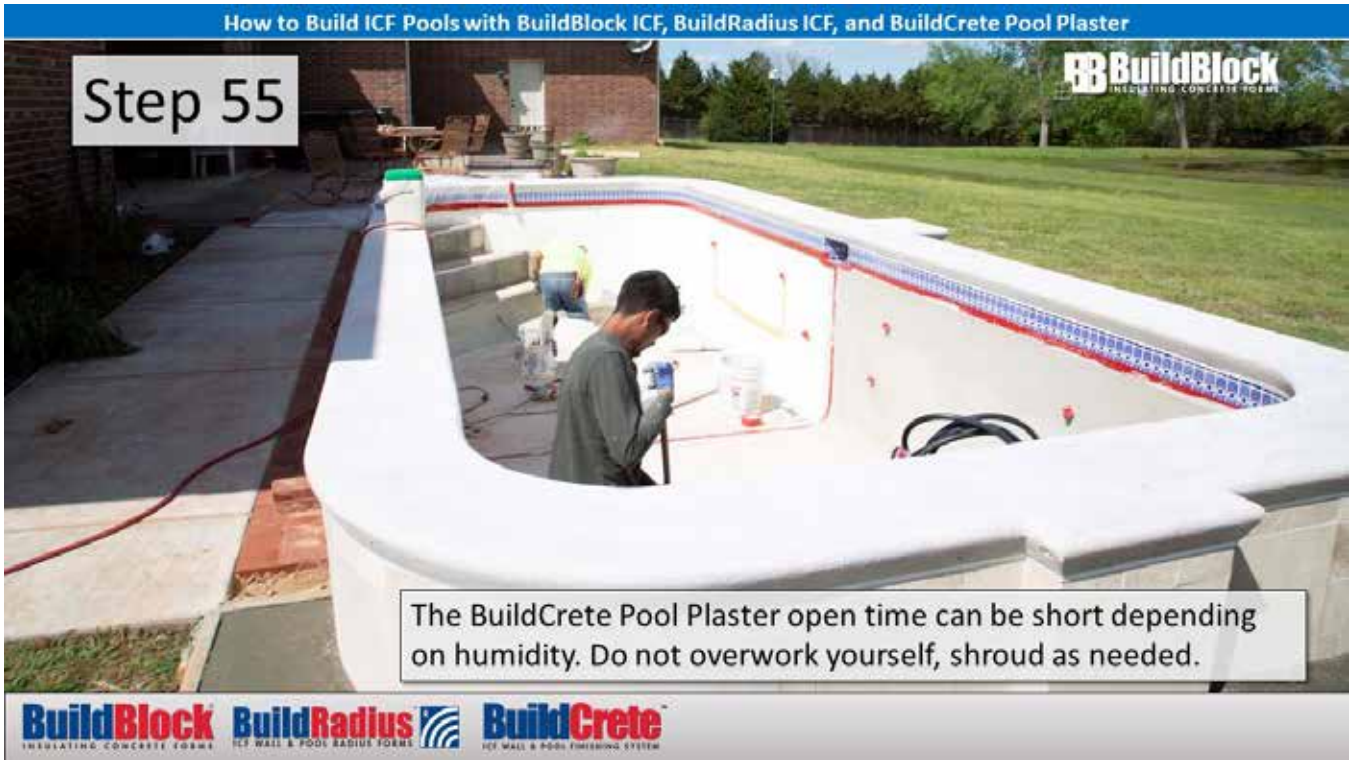

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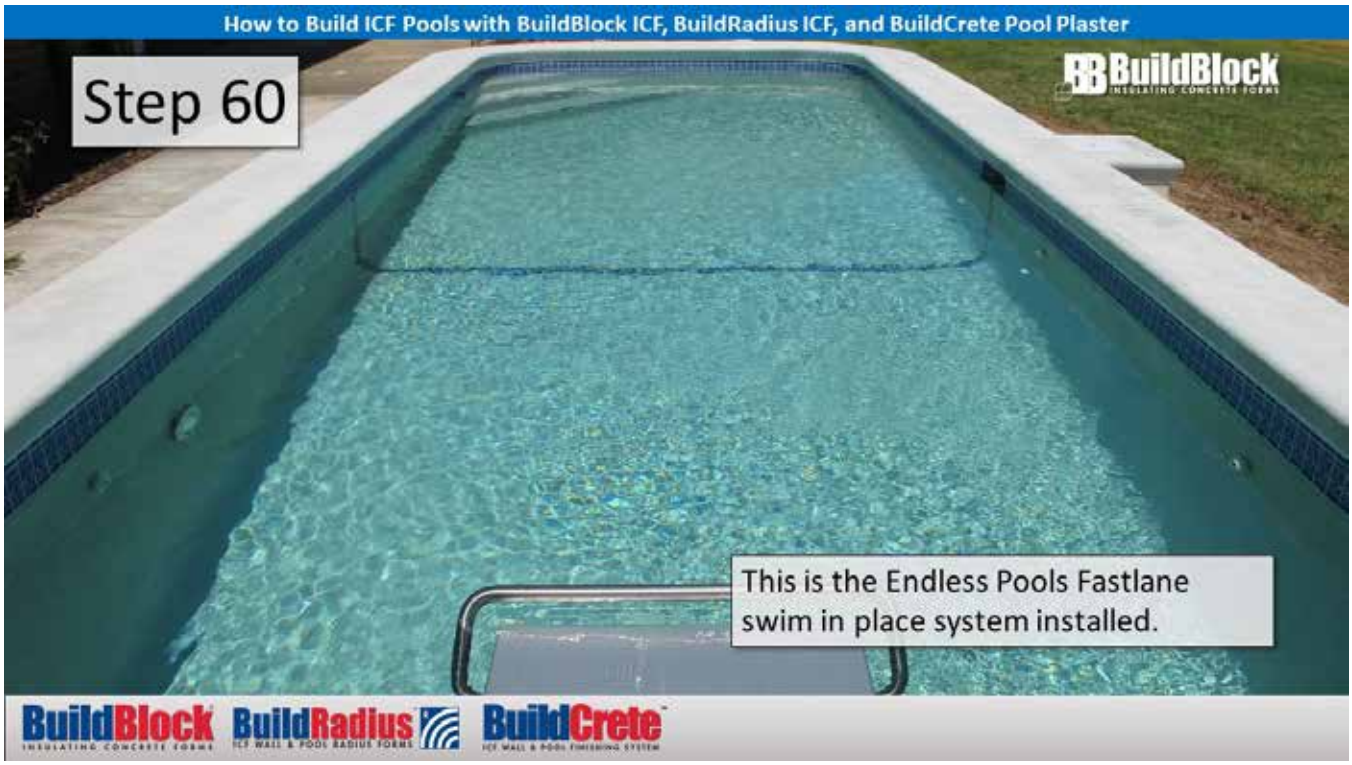

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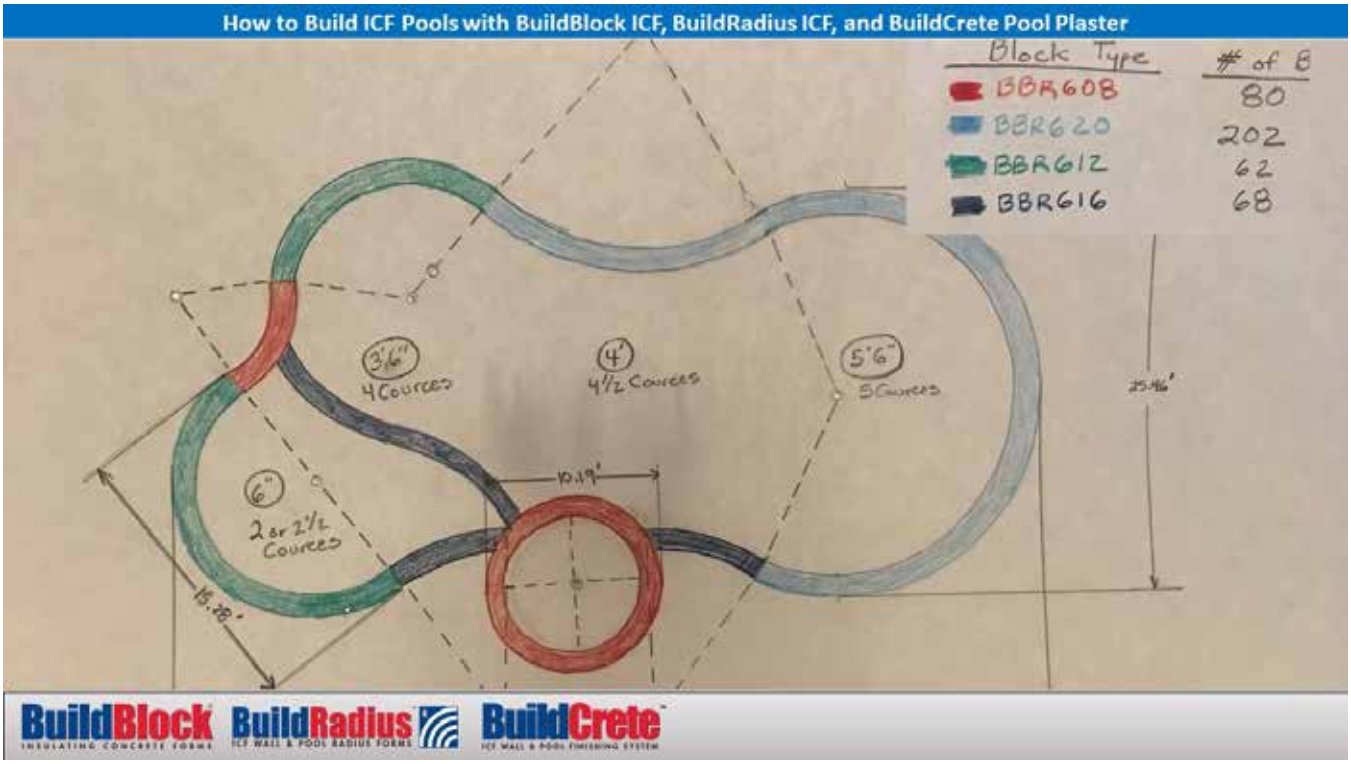

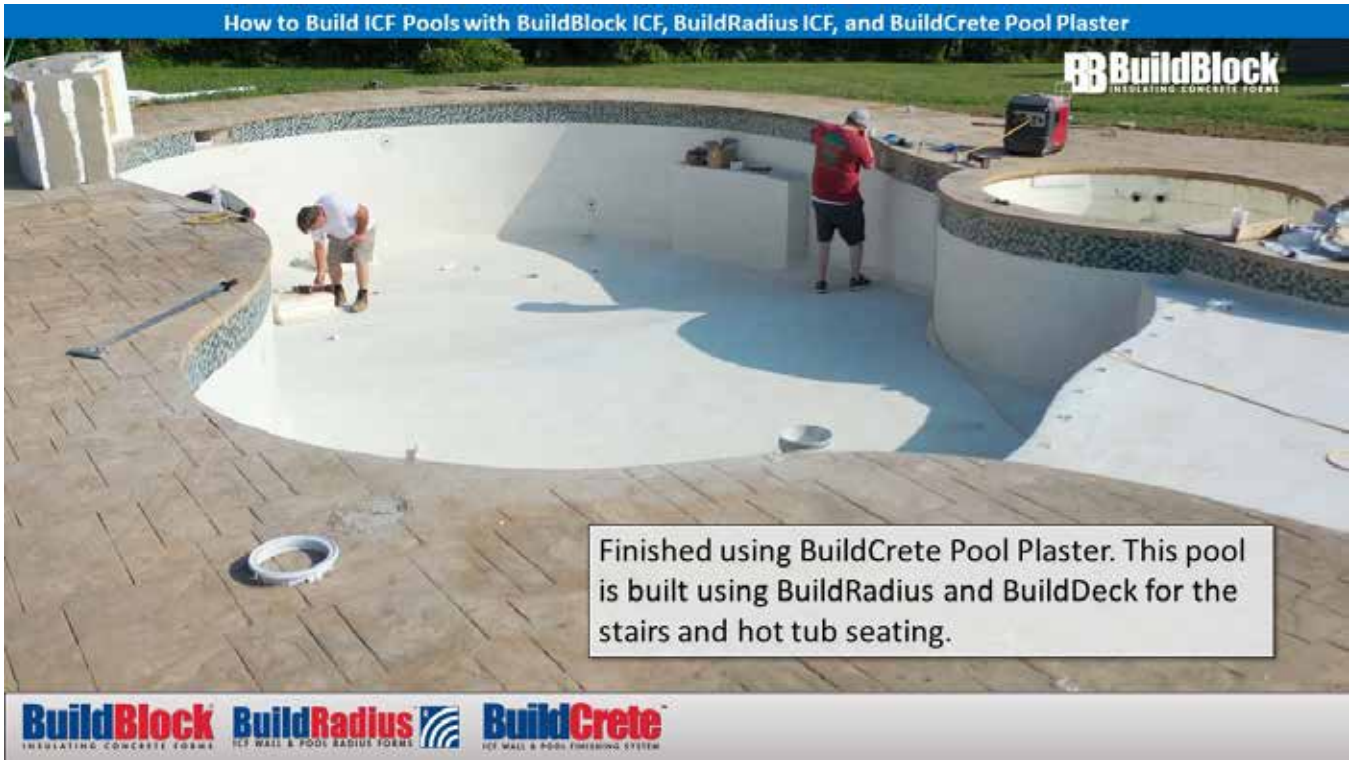

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APPENDIX B: COMMON POOL CONSTRUCTION TERMS

The terms below are common to ICF and Pool Construction. For more information please also refer to the BuildBlock Installation & Technical Manuals found on the BuildBlock website at https://buildblock.com.

Area	The square footage measurement of the amount of flat space the pool takes up in the yard, also used for concrete decks, and also known as "surface area".
Beam	The swimming pool "beam" is an important part of the structure. This part of the pool is located at the top and traces the perimeter shape and will help identify the perimeter measurement of the pool structure. Usually this is where the decorative stone edge is installed just above the tile inside the pool.
Break Break Line Break Point	The point at which the pool depth changes and begins to slope– the break line refers to any place on the swimming pool floor where the angle changes.
Coping	The material that sits on top of the pool "beam" and follows the shape above the waterline tiles is called "coping". The edge of the pool before water starts. Concrete decking will butt up to the backside of this material with a "control joint". Brick, flagstone, travertine or other natural stones are also options.
Coping Track Bead Receiver	The swimming pool liner coping track or bead receiver is a small opening that runs all around the pool right underneath the coping, the liner bead snaps into the coping track. All swimming pool final depth measurements are taken from your bead receiver/coping track.
Decking	The area surrounding the perimeter of the pool is considered the decking. Pool decking can be done in many ways; concrete, textured concrete, pavers, wood/trex, or tile.
Filtration Pump	The filtration pump is the main pool (or spa) pump that pushes water through the system and pool equipment. For pool+spa combinations the equipment will be shared. Several solutions for pool filtration pumps provide single speed, 2-speed, and variable speed options. This pump runs to circulate water and help keep the pool clear.
Finished Depth	The finished depth refers to the actual finished depth of your pool. Unless you have a level pool you will have a deep end and shallow end. The finished depth is typically measured from the liner track/bead receiver/coping to the swimming pool floor.
Footing	In places where the bottom of the pool floor or the decking needs to be substantially reinforced, usually due to pools or decks that are elevated from the ground level.
Gunite	A form of concrete that can be applied using high pressure and molded into almost any shape over a steel reinforcing rebar grid. Gunite is typically harder than poured concrete reaching about 4,000 psi. This is how traditional concrete pools are constructed. This is a more expensive alternative to ICF pools and offers no insulation.
Main Trench	This is where all pool plumbing pipes merge together. It may be as many as 9 – 14 pipes. This is also where the hydraulic lines for the Fastlane Swim-In-Place system will run. The main trench will go to the pool equipment and each pipe into their respective connection.
Mastic	After coping & decking are an installed, control joints are cut into the coping and a flexible type sealant with a decorative finish will ensure that water from the pool or rain will not leak into the control joint gap. BuildCrete Pool Plaster can be used for this as well.
Notch	A method of recessing the shell structure for a more seamless installation of tile and stone materials.
Perimeter	The measurement of the pool beam (top edge) that traces the shape of the pool. Also referred to as the "pool beam. The pool perimeter is important in free-form shape pools when calculating the interior surface area to determine pool finishing materials and tile.
Pool Capacity	The measurement of volume, the amount of water the pool will hold.
Pool Cleaner	These can be manual or robotic type pressure-side cleaners that will catch leaves, dirt, pine needles/cones, and things that drop to the bottom of the pool.
Pool Coping	A pool coping is a finished edge that surrounds the pool. It can be the finished edge of a deck, a poured concrete coping, natural stone or other materials. The pool coping may also hold the liner track (bead receiver). The liner track holds the liner bead in place keeping the liner in place as well. If the finished edge of your deck is exposed concrete or stone pavers this is also referred to as a cantilever coping.

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Pool Drain	A plumbing fixture located in the deepest part of the pool to allow water to drain for maintenance or storage during the winter or other times of disuse. There should be two pool drains to prevent anyone getting trapped from a single point.
Pool Filter	Filtration is one of the key components to having a crystal clear pool. Cartridge filters can catch small debris in the pool water that you cannot see. Pool+spa combinations ,may share the filter between the pool and spa.
Pool Interior	The interior of an ICF pool must be sealed with a quality finish before it will hold any water or be visibly appealing. BuildCrete Pool Plaster delivers superior performance and results compared to traditional pool plasters and other finishes.
Pool Liner Bead	The pool liner bead is wedge shaped strip on the top of the wall to hold the liner in the receiver. There are a few different types of liner beads, your bead will be determined by your liner manufacturer.
Pool Plaster (BuildCrete)	BuildCrete Pool Plaster is the preferred finishing system for ICF pools. BuildCrete is a synthetic plaster product that is 100% waterproof and uses an embedded 11oz fiberglass mesh to deliver superior strength. It also is not a growth medium for algae and is easily cleaned. It can be colored and installed by a variety of applicators. Its expected lifespan is more than twice traditional pool plasters.
Pool Plaster (Traditional)	Pool plaster is the final coating applied to the shell of a concrete in-ground pool. The layer of plaster is normally 1/4 inch to 1/2 inch thick. Pool plaster adds a watertight seal and makes the surface of the pool smoother for contact with swimmers than the underlying rough concrete shell.
Rebar	The standard specs for BuildBlock ICF pools is rebar 12" o/c (on center). The wall steel is tied to the floor and the vertical steel from the footing.
Sanitation (Chlorine, UV, Salt Water, Bio Pools, etc.)	There several options for keeping your pool sanitary and safe: Chlorine Tablets, Salt Chlorine Generators, UV & Ozone (O3) chlorine generators to suite your preference. Chlorine fights against bacteria in the water keep the pool sanitary. Some options like chlorine might be irritating to some swimmers, choose the best solution for your pool.
Spillway	The opening at water level where the raised spa spills into the pool.
Surface Area	This term refers to the square footage of area of water only inside the pool. As a 2d top down representation this is the footprint of the pool which can be understood as the size of pool, or how much space in the yard the pool will take up.

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NORTH AMERICAN MANUFACTURING FACILITIES

BuildBlock Building Systems has fifteen manufacturing facilities across North America and plans to add locations for the next several years. This means we have the manufacturing capacity to meet your ICF needs now and in the future. Shorter shipping distances mean lower freight costs for you and your customers.

BuildBlock continually develops new products and technologies solving problems and meeting needs in residential, commercial, industrial, and institutional construction. We innovate with the goal of creating cost-effective techniques and products for our customers.

Choosing BuildBlock isn't just about choosing the best ICF block on the market, it's about finding a partner with a strong commitment to our customers, our business partners, and our industry.

MISSION

We envision a world where BuildBlock ICF technology delivers energy-efficient, safe, healthy, comfortable and sustainable ICF homes and buildings to millions of people worldwide through the uncompromising integrity of BuildBlock's team of distributors, dealers and customers.

VISION

To harmoniously use the extraordinary gifts and talents of our distributors and dealers to fulfill the goals and dreams of millions of people who want to build better structures as reflected by our motto: "Build it once. Build it for life."

To manufacture one of the most affordable and highest quality Insulating Concrete Forms available in the world today.

To build greatness by providing the resources and services needed for building successful ICF businesses and sustainable ICF structures.

To build an enduring, profitable company while conducting business with Godly character, fairness and integrity.

VALUES

INTEGRITY – We strive to balance the best interests of our distributors, dealers, customers, employees, and investors in an environment of Godly character and honesty.

EDUCATION – We seek to educate the public on the valuable benefits of ICF structures while recognizing that in order to expand the industry, we must educate installers, architects, and engineers in ICF best practices.

CUSTOMER SATISFACTION – We commit to building a team of employees that is inspired, empowered, and driven to meet the ever-changing needs of our distributors, dealers, and customers while we seek to distinguish ourselves in the marketplace by delivering exceptional customer satisfaction.

INNOVATION – We value and invest heavily in innovation while continually expanding our product line through the development of technologically advanced products.

QUALITY – We commit to producing the finest quality products. We stand by the belief that our brand embodies quality, consistency, user satisfaction, and service.

PROFITABILITY – We commit to the strong work ethic and financial prudence necessary to deliver financial results for our business partners and investors and to ensure a Long-term profitable relationship.

EMPOWERMENT – We dedicate ourselves to empowering people to improve and enrich their lives and the world around them.

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866-222-2575 Toll free
405-840-3386 Office
831-597-0792 Fax
buildblock.com
store.buildblock.com
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SOCIAL MEDIA

The day for building your walls will come,
the day for extending your boundaries.
Micah 7:11

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