

## Design Professional's Guide and CSI Specifications

### Introduction

During the past decade, insulating concrete form (ICF) construction has accounted for an ever-increasing share of the overall construction market. Architects and designers throughout the country have found that ICFs meet their design and technical challenges easily and economically, while providing value-added structures to their customers.

The following is an overview of the iForm® by Reward Wall Systems. iForm is acknowledged as the most technologically advanced ICF in the industry, because of its innovative design and technical features that set it apart from other ICFs. Since its introduction in the spring of 2000, the easy-to-use iForm has become the ICF of choice for commercial projects ranging from small strip malls to multi-story condominiums, hotels and theaters, schools, churches, assisted living and nursing homes, as well as a wide range of residential projects. In addition, Reward Wall Systems, Inc. goes *Beyond the Block* to provide design support, on-site support, diverse products, technical services, comprehensive building codes, Revit BIM object libraries and the best customer service in the industry, to ensure each project goes up smoothly and quickly.

### iForm Advantages

iForm is a sustainable green product that saves energy and provides storm safety as well as a quiet, comfortable interior environment.

When designing and building with the iForm you get 5-in-1 construction by providing the structural wall, the furring for interior and exterior attachment, insulation, air barrier and vapor barrier. While providing the 5-in-1 construction increased energy efficiency, wall strength, fire rating and sound ratings are achieved.

### Sustainable/Green Building and LEED v3

Reward ICFs allow architects and designers to create buildings that use fewer natural resources and are more sustainable. Reward ICFs:

- Reduce waste at the construction site, and any waste produced is 100% recyclable
- Use fewer natural resources, such as gas, electric and wood
- Are manufactured clean, producing no HCFCs or CFCs during the manufacturing process, and they contain no formaldehyde
- Reduce operating costs by optimizing the energy efficiency
- Create structures that last longer and with less maintenance

The iForm contains recycled plastic tie inserts. Contact Reward for the percentage of recycled content. The expanded polystyrene (EPS) and plastic tie inserts are 100% recyclable. The link below provides state by state locations that recycle EPS. The concrete is recyclable as well.

<http://www.epspackaging.org/>

Projects built with Reward ICFs have achieved LEED status as Reward ICFs can help you contribute points in 6 of the 7 Topics of the LEED v3 rating system. A detailed explanation can be found in the "Technical Bulletins" section of the *Reward Wall Systems Product Manual*.

## Energy Efficiency

Because of the high R-22 R-value, the thermal mass and the low air infiltration rates, Reward structures can save as much as 50-80% on heating and cooling costs compared to the heating and cooling costs for conventionally built structures.

## Quiet and Comfort

Reward ICFs create a clean, virtually airtight, interior environment. The monolithic concrete walls, surrounded by several inches of expanded polystyrene (EPS), serve as a barrier to drafts, pollens and other pollutants. With an excellent sound transmission rating, a Reward wall is one of the "quietest" wall systems available, reducing loud exterior noises to the level of a whisper inside.

## iForm Characteristics and Uses

iForm is designed to function as the formwork for a cast-in-place concrete wall. The formwork stays in place as insulation on the exterior and interior face of the wall assembly, and also serves as attachment for exterior and interior finish systems. It forms a solid flat steel-reinforced cast-in-place concrete wall of 4", 6", 8", 10", or 12" thicknesses that is the structural component of the wall assembly.

iForm is used in commercial and residential construction for exterior and interior, load bearing and non-load bearing, above grade and below grade walls. Specific applications include frost walls, basement walls, storm shelters, demising walls, slab on grade walls, non-load bearing walls on post tension floor slabs, and single story to multi-story walls.

iForm is a modular pre-assembled form that is stacked together in running bond creating a concrete cavity of various thicknesses. It has two faces or panels of EPS material 2½" thick that are held together by plastic ties spaced 6" on center.

Product literature, specifications, step-by-step installation procedures, technical information, AutoCAD details, Dynamic Block details, Revit BIM objects, CSI Specifications, technical bulletins for specific trades, code evaluation reports are available on our website and product samples are available upon request.

Revit BIM objects are available for free download on our website, to create plan and wall sections. They can also be downloaded from SmartBuilding index, SmartBIM library and Autodesk Seek.

## iForm Raw Materials and Manufacturing

iForm is shape molded to a nominal 1.5 pcf density using Type 2 flame retardant EPS to form two panels of insulation. A pentane gas inside the closed cell EPS resin bead is used to pre-expand the EPS resin beads. After the pre-expanded beads are injected into the mold cavity, steam and heat are applied to shape mold the product. Virtually all of the pentane gases are disbursed by the time the forms are shipped.

Plastic ties, molded from polypropylene plastic, are inserted into the mold during the shape molding process.

Complete MSDS sheets about the raw materials in iForm are available on request or on our website.

## **iForm Types and Sizes Available**

All iForms are pre-assembled and modular. The type and size of product is determined by structural requirements, fire and sound rating requirements and designer or owner preference.

The pre-assembled forms are available in different types to make the construction process more efficient. The 90-degree and 45-degree corner forms eliminate the need for special miter and bracing corners. The ledge form is available for creating a ledge to support brick or stone or to support an intermediate floor system. Taper top forms are available to provide additional concrete bearing for specific applications such as supporting precast hollow core plank floors or demising walls. A pre-assembled T-Form makes the construction of a two intersecting walls very efficient. The patented xLerator® is available to reinforce the concrete ledge effectively and efficiently. Reward also offers the tieKey® an adjustable masonry anchor for brick and stone finish attachment, and the NoricF4 Custom Metal ICF Frames for doors and window openings.

## iForm Specifications

<b>Straight</b>	<b>Length</b>	<b>Concrete Width</b>	<b>Return</b>	<b>Surface Area</b>
9" Form	48"	4"	N/A	5.33 SF
11" Form	48"	6"	N/A	5.33 SF
13" Form	48"	8"	N/A	5.33 SF
15" Form	48"	10"	N/A	5.33 SF
17" Form	48"	12"	N/A	5.33 SF
<b>Standard 90° Corner</b>	<b>Outside Length</b>	<b>Concrete Width</b>	<b>Return</b>	<b>Surface Area</b>
9" Form	25"	4"	13"	4.22 SF
11" Form	27"	6"	15"	4.67 SF
13" Form	29"	8"	17"	5.11 SF
15" Form	31"	10"	19"	5.54 SF
<b>Extended 90° Corner</b>	<b>Outside Length</b>	<b>Concrete Width</b>	<b>Return</b>	<b>Surface Area</b>
9" Form	31"	4"	19"	5.55 SF
11" Form	33"	6"	21"	6.00 SF
13" Form	35"	8"	23"	6.44 SF
17" Form	39"	12"	27"	7.33 SF
<b>45° Corner</b>	<b>Outside Length</b>	<b>Concrete Width</b>	<b>Outside Return</b>	<b>Surface Area</b>
9" Form	22"	4"	10"	3.55 SF
11" Form	22"	6"	10"	3.55 SF
13" Form	22"	8"	10"	3.55 SF
<b>Ledge Form</b>	<b>Length</b>	<b>Concrete Width</b>	<b>Return</b>	<b>Surface Area</b>
11" Form	48"	6" + 4 1/2" Ledge	N/A	5.33 SF
13" Form	48"	8" + 4 1/2" Ledge	N/A	5.33 SF
<b>Taper Top</b>	<b>Length</b>	<b>Concrete Width</b>	<b>Return</b>	<b>Surface Area</b>
11" Form	48"	6" + 1 7/8" Ledge	N/A	5.33 SF
13" Form	48"	8" + 1 7/8" Ledge	N/A	5.33 SF
<b>T-Form</b>	<b>Length</b>	<b>Concrete Width</b>	<b>Return</b>	<b>Surface Area</b>
11" Long	48"/16"	6"	N/A	5.33 SF, 6.61 SF
11" Short	48"/4"	6"	N/A	5.33SF, 5.0 SF

## iForm Concrete Use

<b>Straight</b>	<b>1 Cu. Yd. Fills:</b>	<b>Sq. Ft. Wall Area Filled (Cu. Yd.)</b>	<b>Volume Per Form (Cu. Yd.)</b>
9" Form	15.1 Forms	80.0	0.0658
11" Form	10.0 Forms	53.8	0.0988
13" Form	7.5 Forms	40.5	0.1317
15" Form	6.0 Forms	32.3	0.1646
17" Form	5.0 Forms	27.0	0.1975
<b>Standard 90° Corner</b>	<b>1 Cu. Yd. Fills:</b>	<b>Sq. Ft. Wall Area Filled (Cu. Yd.)</b>	<b>Volume Per Form (Cu. Yd.)</b>
9" Form	25.0 Forms	105.5	0.0400
11" Form	15.7 Forms	73.3	0.0637
13" Form	11.0 Forms	56.2	0.0909
15" Form	8.3 Forms	44.2	0.1200
<b>Extended 90° Corner</b>	<b>1 Cu. Yd. Fills:</b>	<b>Sq. Ft. Wall Area Filled (Cu. Yd.)</b>	<b>Volume Per Form (Cu. Yd.)</b>
9" Form	17.8 Forms	98.8	0.0562
11" Form	11.3 Forms	67.8	0.0885
13" Form	8.1 Forms	52.2	0.1235
17" Form	5.0 Forms	36.4	0.2016
<b>45° Corner</b>	<b>1 Cu. Yd. Fills:</b>	<b>Sq. Ft. Wall Area Filled (Cu. Yd.)</b>	<b>Volume Per Form (Cu. Yd.)</b>
9" Form	25.5 Forms	90.5	0.0392
11" Form	16.5 Forms	48.5	0.0606
13" Form	12.2 Forms	43.3	0.0820
<b>Ledge Form</b>	<b>1 Cu. Yd. Fills:</b>	<b>Sq. Ft. Wall Area Filled (Cu. Yd.)</b>	<b>Volume Per Form (Cu. Yd.)</b>
11" Form	7.7 Forms	41.3	0.1290
13" Form	6.1 Forms	32.9	0.1619
<b>Taper Top</b>	<b>1 Cu. Yd. Fills:</b>	<b>Sq. Ft. Wall Area Filled (Cu. Yd.)</b>	<b>Volume Per Form (Cu. Yd.)</b>
11" Form	9.1 Forms	48.5	0.1210
13" Form	7.0 Forms	37.3	0.1539
<b>T-Form</b>	<b>1 Cu. Yd. Fills:</b>	<b>Sq. Ft. Wall Area Filled (Cu. Yd.)</b>	<b>Volume Per Form (Cu. Yd.)</b>
11"	7.3 (Short)	51.4 (Short)	0.1121 (Short)
	8.9 (Long)	51.9 (Long)	0.1368 (Long)

## iForm Design Features

The factory formed iForm straight and corner forms are designed as universal blocks with no top or bottom, and no male or female ends. The universal design and the strong, interlocking open tooth design make for quick, easy stacking and successful concrete placement.

The plastic tie inserts, spaced 6" on center, provide additional form strength during concrete placement. The ties provide loose fit and two-deep, snap-in horizontal rebar chairs at several locations within the form. The loose fit eliminates the strain of bent rebar on the wall while the two deep snap-in chairs allow for rebar overlap without tying.

The 1¼" wide plastic ties are recessed ½" below the EPS surface and run the full height of the block to form continuous vertical furring strips every 6". The furring strips are marked on the exterior and interior face of the form making it easy to correctly attach exterior and interior finishes. Because the ties are recessed, traditional and acrylic finishes can be applied directly to the forms. The corner forms

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contain a full-height, double bridging H-bracket. The H-bracket offers the most corner attachment flexibility in the industry, while providing maximum stability during installation.

Within the block, the plastic ties form two tie rods that allow the iForm to be cut in half horizontally creating two blocks in one. The tie rods are spaced every 8 inches vertically. Because the 16" high blocks are the same on the top and bottom, they can be ripped every 8" and both halves can be used without wasting any product. The two-tie rod design also provides a very open cavity to allow for good concrete flow.

The tie rods provide multiple rebar positioning to allow for the most efficient structural design. The concrete wall may be designed with one or two mats of horizontal or vertical rebar. Vertical rebar should be designed in increments of 6" on center. Horizontal rebar should be designed in increments of 16"; however, if necessary it can be designed in increments of 8".

## iForm Code And Standard Conformance

The iForm has been evaluated for compliance by the following code agencies for the following building codes.

- ICC ES Report - ESR 1552  
International Code Council Evaluation Service, ICC ES report for compliance to the 2009 International Building Code, the 2009 International Residential Code, the 1999 BOCA/National Building Code, the 1999 Standard Building Code, the 1999 Uniform Building Code, the 1988 International One and Two Family Dwelling Code and the SBCCI Standard for Hurricane Resistant Residential Construction SSTD-99.
- State of Wisconsin report 200715-I
- City of New York report MEA 116-03-M
- City of Los Angeles report RR 25418
- Miami-Dade County report 08-0805.19
- Florida Product Approval FL 1743
- Canadian Construction Materials Centre (CCMC) report 13107-R
- Ontario Minister's Ruling No. 04-20-124 (13107-R)

The International Residential Code also has adopted ICF construction in Sections R404.4 and R611.

As required by the building code, the EPS insulation material is listed as an approved material by a third party agency and tested to meet the required surface burning characteristics of ASTM E84 and physical properties of ASTM c578 and CAN/ULC-S701-97.

The structural wall design is required to be in accordance with the current ACI 318 revision. Reward provides prescriptive design tables for above grade walls, below grade walls and lintels in our comprehensive *Reward Wall Systems Product Manual*.

## iForm Test Conformance

Reward's iForm has undergone the following third party testing:

- **Sound Loss Transmission**
- **Fire Resistance**
- **Moisture Management** (i.e. Condensation, Mold, Avoiding Moisture Problems at Penetrations, Windows & Doors, Infiltration of Moist Air, etc.)
- **Fastener Testing**

For more information please refer to the Test Conformance section of the *Reward Wall Systems Product Manual*.

## iForm Performance Values

iForm	17"	15"	13"	11"	9"
<b>Steady State R-value</b>	22	22	22	22	22
<b>Thermal Mass (psf)</b>	150	125	100	75	50
<b>Air Infiltration</b>	.04-.09 ACH	.04-.09 ACH	.04-.09 ACH	.04-.09 ACH	.04-.09 ACH
<b>Fire Ratings (Design listings by Omega Point Laboratories)</b>	4 hr.	4 hr.	4 hr.	3 hr.	1 or 2 hr.
<b>Sound Transmission</b>	TBD	TBD	TBD	48 – 65	41 – 65

## Structural Design

The structural design of the Reward ICF walls consists of concrete plain or reinforced wall design in accordance with ACI 318. There is nothing new or different. There are a few details that should be noted that would be helpful for efficient construction.

The vertical reinforcement schedule is most efficient when the spacing is on 6 inch increments. The horizontal reinforcement schedule is most efficient when the spacing is on 16 inch increments. Eight inch horizontal spacing is doable but not as efficient as 16 inch spacing.

Certain aspects of the design may be affected by the 2 ½" of EPS foam that remains in place that can create additional eccentric loading.

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The iForm has multiple rebar chairs available in various positions. The dimensional location of these positions can be found by referring to the Reward product details found in the AutoCAD details section of the Reward Product Manual. These are the dimensions that should be used for calculating the 'd' location of the rebar. Also refer to the reinforcement section found in the Product Manual.

If a column rebar cage is required, again, the horizontal tie spacing should be on either 8 or 16 inch increments.

## iForm Vertical Courses And Stories

iForm is used for both single story and multi-story walls. The load bearing capacity for iForm walls is typically 4 to 8 stories, but iForm has been used as infill, non-load bearing walls in multi-story buildings, and it can be engineered to go even higher.

Different wall thicknesses or block sizes can be designed to transition between subsequent floor levels. A 2" step must be incorporated into the design when transitioning between block sizes from floor to floor. The 2" step is typically hidden within the floor system.

### Standard Course or Wall Heights (16" Course Increments)

Course	Wall Height	Course	Wall Height
1	1' 4"	7	9' 4"
2	2' 8"	8	10' 8"
3	4' 0"	9	12' 0"
4	5' 4"	10	13' 4"
5	6' 8"	11	14' 8"
6	8' 0"	12	16' 0"

The iForm is 16" high. Therefore the most convenient course increment or wall height is 16". Each iForm block can be ripped in half to provide two 8" high blocks. The 8" height is marked on both sides of the product with a raised EPS bead line. When ripped, both halves of the block can be utilized, eliminating waste. The 8" half block is typically placed on the bottom or top course so that the interlocking teeth connect. The plastic tie insert is designed so that a plastic tie remains in each half block..

### Ripped Course or Wall Heights (8" Course Increments)

Course	Wall Height	Course	Wall Height	Course	Wall Height	Course	Wall Height
1	0' 8"	7	4' 8"	13	8' 8"	19	12' 8"
2	1' 4"	8	5' 4"	14	9' 4"	20	13' 4"
3	2' 0"	9	6' 0"	15	10' 0"	21	14' 0"
4	2' 8"	10	6' 8"	16	10' 8"	22	14' 8"
5	3' 4"	11	7' 4"	17	11' 4"	23	15' 4"
6	4' 0"	12	8' 0"	18	12' 0"	24	16' 0"



## iForm Wall Layout And Dimensioning

The biggest difference between ICF construction and wood or metal frame construction is that the ICF wall assemblies are typically thicker. The thicker walls must be accounted for in the design phase.

The wall thickness becomes an issue when you want to keep the interior dimensions the same as in a comparable frame plan. The overall exterior dimensions are increased to keep the same interior dimensions or square footage of the building. Usually the interior walls are framed, but the increased ICF wall thickness must be accounted for in the case of demising interior walls.

Utilize the Reward Dynamic Block or Revit BIM object library details for creating plan and elevation wall sections.

Any plan dimension can be designed. Generally it is not necessary to design to any specific dimensions. However, modular design guidelines feature standard dimensions that, if used, will reduce construction costs due to reducing labor and minimizing waste. Reward usually does not recommend making compromises to the design to accommodate the block dimensions. Design the building using normal design practices, allowing the block to be adjusted to accommodate the design. In some cases it may make sense to incorporate a modular building layout to make the most efficient use of the modular iForm product. (See Appendix A.)

The iForm interlocking teeth are designed to interlock perfectly when the wall length is a multiple of 2". If the wall length is not a multiple of 2", it still can be easily constructed by using a common splice.

Designs that utilize 90° and 45° corners are the most efficient since iForm features pre-assembled 90° and 45° corner blocks. Corners of any other angle also can be constructed by mitering straight blocks in the field. Walls with nearly any radius can be built using straight forms as easily as other types of construction.

Any bump-outs and bay-outs easily can be achieved with the 90° and 45° pre-assembled corners. The most efficient designs will incorporate bump-outs using the modular layout dimensions described in Appendix A.

For cantilever and inset walls the most straightforward approach is to ensure that upper floor levels follow the wall layout of the lower stories. If this is not desirable or possible, structural engineering will be required.

The step-by-step section in the Product Manual provides additional detail regarding wall layout.

## Doors and Windows

iForm accommodates any height of doors or windows. Reward recommends placing the tops of doors and windows at the top of a course height, to save both labor and materials by eliminating the necessity of cutting the blocks.

Door and window jambs may be placed as close to a corner as needed as long as the wall is structurally adequate. It is necessary to allow enough wall space for finish work and proper functioning of the door or window. The spacing between two or more doors or windows is determined by the need for the

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structural design to allow for adequate steel reinforcement placement and to have enough wall space for finish work.

Windows are usually installed flush to the exterior face of the wall, but they also may be recessed inward to have the jambs flush to the inside. The choice is between a deep inside windowsill or a deep recess outside.

When the window is set to the outside, providing a deep inside window sill, normal flashing and exterior treatment is required. On the interior, drywall is typically wrapped onto the sill, jambs and head. If wood trim is desired, the jambs are quite deep and require more trim material than normal. This is accomplished with jamb and sill extensions.

The hinge side of the door must be considered due to the thicker wall. Exterior hinged doors that are hung to the Reward wall should be installed so that the hinge is flush with the inside wall. This allows the door to open fully without hitting the door jamb. Doors should be specified with threshold and jamb extensions to reflect the thicker wall plus the exterior and interior cladding.

There are many types of door and window bucks as well as a few different methods of buck installation. The buck types consist of treated wood, regular lumber with some means of protection from concrete, metal, vinyl, other plastic or composite materials. Another option is to construct temporary bucks with metal or wood and then remove the bucks after concrete placement and hardening of the concrete. With this method, the doors and windows are anchored direct to the concrete wall.

The different methods of installing the bucks include running the buck across the full width of the iForm with or without a flange that returns along the inside and outside face of the form. Another method is to inset the buck into the concrete core by keeping it flush around the perimeter of the opening. A stay in place buck must have a means of anchoring to the concrete wall.

For heavy commercial construction, Reward offers the NoricF4™, durable customer metal ICF frame. This is a two-in-one product consisting of both the “block out” buck to stop the concrete around the openings and also the frame for the door or window. It is a pre-welded and pre-assembled fabricated metal frame that fits any ICF form size and is shipped direct to the jobsite. The combination of the 2-in-1 product and the pre-welded and pre-assembled product saves many tasks that save time and money on a project.

Proper flashing with either a compatible peel and stick or a liquid applied membrane is required around door and window openings.

Refer to Door and Window AutoCAD details and the step-by-step door and window section found in the Product Manual. Lintel prescriptive designs can be found in the engineering section of the Product Manual.

## Floor Systems

Any type of floor system can be integrated to the Reward iForm wall. There are many different floor systems with different methods of connecting to the iForm. Refer to the Floor step-by-step section and the AutoCAD floor details found in the Reward Product Manual.

The ledge form and taper top products can be utilized to support some floor systems efficiently.

Wood frame floors are connected to the side of the wall system by rim joists or ledger boards. The floor joists, or trusses either are hung from joist hangers fastened to the ledger or bear on the ledger. The ledger can be installed at any height of the wall.

Structural concrete floor systems such as pre-cast hollow core planks, composite concrete floors or post-tension slabs also may be designed. In order to provide efficient construction and to minimize bracing, it is recommended that you consider the 16" or 8" form height with respect to floor elevation and floor thicknesses.

## Electrical, Mechanical And Plumbing

Since the Reward wall ultimately becomes a solid concrete wall, the electrical, mechanical and plumbing penetrations through the wall must be carefully pre-planned. Penetrations are easily accommodated before the concrete is placed by installing sleeves through the wall. Examples of items that would need penetrations include exterior lighting, dryer vents, water faucets, service entrances and the main utility box.

### Electrical

Electrical boxes and wiring are installed after the concrete is placed by using an electric hot knife or other cutting tool to route channels into 2 1/2" thick EPS foam. Run horizontal wires between the horizontal seams of the blocks whenever possible to avoid cutting into the plastic ties.

### Plumbing and Ductwork

Plumbing should be pre-planned so that the plumbing lines are run on interior walls. If it is necessary to run any plumbing lines into the Reward wall, they easily can be routed into the 2 1/2"- thick foam by creating chases with an electrical hot knife or other cutting tool. In some cases it may make sense to fur out a wall section.

To simplify installation, Reward recommends pre-planning the ductwork so that it runs along the interior walls. When it is necessary to run any ductwork on exterior walls the wall must be furred out.

For additional information, refer step-by-step section in the Reward Product Manual.

## Exterior Finishes

Any typical exterior finish, such as any type of siding, traditional stucco, textured acrylic stucco and brick or stone veneer may be used with Reward walls. Siding is fastened to the plastic ties using coarse thread corrosion-resistant sharp point screws. Metal lath is fastened to the plastic ties when using traditional stucco. Textured acrylic finish is applied directly to the forms. The Reward ledge form reinforced with the Reward xLerator® supports brick and stone veneer. Brick ties are typically fastened to the plastic ties. Reward offers the tieKey, an adjustable masonry anchor, that gets anchored to the concrete wall. A 1" air gap is recommended between the face of the iForm and back face of the masonry. Additional layers of building felt, building wrap or any other substrate are **not** necessary. It is important to note that when textured acrylic stucco is applied, it must be applied over the EPS foam and not bridge over any dissimilar materials. This typically becomes an issue around openings. A band of architectural EPS may be required around opening to prevent cracking of the acrylic stucco.

## Interior Finishes

All interior walls in habitable spaces must have a 15-minute thermal barrier in compliance with ASTM E-119. Typically this is ½" drywall. Interior walls where ½" drywall is not needed/specified, a spray on applied, stucco-like finish can be used. It has passed all appropriate tests. This product works especially well for gymnasium, elevator shaft and school walls. Permeable paint, paper and plaster finishes are recommended. Impermeable finishes are **not** recommended.

## iForm Design Awareness Considerations

Because of the differences between ICF construction and standard frame construction, certain issues must be taken into consideration when designing and building with iForm.

### Building Codes

When using the product on buildings of Type I, II, III or IV construction or noncombustible type construction, please refer to the ICC ES ESR 1552 evaluation report. Building officials may require special inspections for placement of concrete and steel reinforcement according to the local building code.

### Thermal Barrier

The Reward ICFs, including habitable spaces in basements and garage walls, must be separated from the interior of the building with an approved 15-minute thermal barrier. An exception is made for crawl space construction when entry is limited to service of utilities, it doesn't connect to basement areas, it is properly ventilated and the air is not circulated to other parts of the building. PlasterMax by Gigacrete is an alternate interior finish to ½" regular gypsum board to satisfy the 15-minute thermal barrier requirement. This product works well for gym, school and elevator shaft walls.

### Sizing HVAC

Building with Reward walls creates a very energy efficient exterior building envelope. The exterior walls have a high R-value, thermal mass and very low air infiltration that must all be considered in sizing the mechanical HVAC system. It is very important to size the HVAC system right, to maximize the energy efficiency and to properly remove indoor moisture. To properly size the HVAC system each building should be sized using a software like DOE2 or Energy Plus or similar in order to properly account for the R-Value, thermal mass and low air infiltration rates.

### Protection From UV Rays

iForm is made from EPS foam and plastic, which is subject to UV degradation. Reward recommends that the forms be covered for protection from UV rays if they are to be stored outside for an extended period of time. Also if there is a large time lag between stacking the forms and placing the concrete, the top course should be covered to protect the plastic ties.

The only time UV degradation becomes an issue is when an exterior or interior material is to be directly adhered to the EPS. In that case Reward recommends rasping the degradation from the surface of the wall. UV degradation does not affect the performance of the wall system.

## Wall Construction

A light gauge metal track is one method that works well for laying out and leveling the first course of iForm.

The structural floor diaphragm must be in place or the walls must be adequately braced prior to backfilling. Vertical alignment and bracing is recommended every 6'-0" when stacking and placing concrete.

Cover the top interlocking teeth with tape when you are planning to place concrete on a subsequent pour or if there is a chance of rain, snow, or sleet.. This will eliminate concrete and precipitation from getting in the teeth and affecting the interlocking of the subsequent course.

When you are using brick ties to tie brick veneer to the exterior face of the building in high seismic or wind design areas, it may be necessary to fasten the brick tie to the concrete in lieu of the plastic ties. The Reward tieKey product is an adjustable masonry anchor that is available for anchoring into the concrete wall. Refer to AutoCAD details 6-16 to 6-18.

## Parapets

Parapets can be designed and installed using the iForm ICF wall. Refer to the step-by-step roof section of the Reward Product Manual and AutoCAD details 5-03 to 5-07. The roof membrane must be compatible with the EPS foam plastic or an additional substrate layer must be fastened over the ICF form in those areas. EPS foam plastic is not compatible with petroleum or solvent based products.

## Embed Plates

There are many cases where a steel embed plate can be designed and installed to connect members such as steel beams or steps and step rails. AutoCAD detail 11-20 depicts an embed plate application.

## Demising Walls

The iForm makes a great structural load bearing demising wall because of its load bearing capacity, fire and sound ratings for needed applications such as between condos, hotel rooms and theaters. The taper top product is recommended for the top bearing course at each floor level.

## Waterproofing and Termite Protection

Reward walls require proper waterproofing below grade using material compatible with EPS. The ICF-Compatible Construction Products section of the *Reward Product Manual* lists several products that work well as waterproofing membranes. A drainage mat or protection mat is usually recommended between the waterproofing membrane and the backfill. Air gap or peel and stick type waterproofing membranes are recommended. Brush-on, spray-on or trowel-on membranes are not recommended. Other standard waterproofing techniques such as proper flashing, drainage, grading and sealing are required.

In areas vulnerable to termite infestation, Reward recommends using Polyguard 650XTP waterproofing membrane below grade. This product has been approved as termite protection and waterproofing on ICF walls by SBCCI PST & ES. Initial and on-going termite resistant soil treatment is recommended.

## Attachment

When planning to hang heavy cabinets or fixtures from the Reward wall, backing should be installed either before or after the concrete is placed. The backing should be fastened to the concrete wall using concrete fasteners and installed so that it is flush with the surface of the EPS foam face. A hot knife is used to remove the EPS foam and create the space for the backing.

Updated on: 10/27/2009

Release: J



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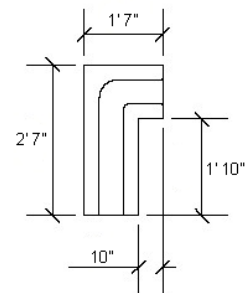
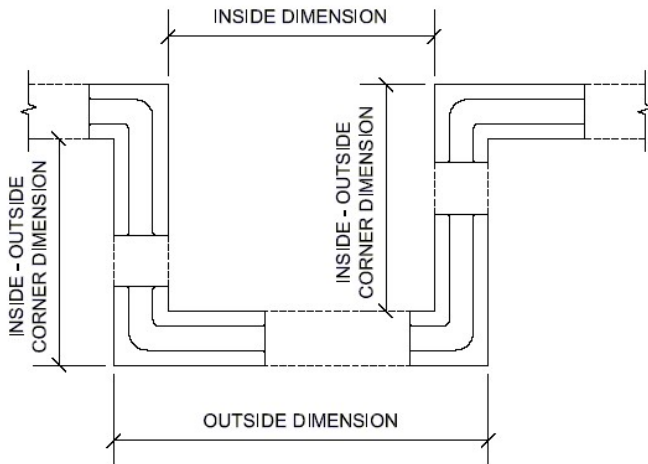
A product called the Grappler is available as a backing for curtain rods, towel bars or tissue holders. The Grappler is a perforated steel plate that is pressed into the EPS foam where the items being hung from the wall are located. After the drywall is installed, the Grappler plates can be located with a stud finder, and the items can be attached in the conventional way.

## APPENDIX A

### Architectural Dimensions For 9" iForm Extended 90-Degree Corner

iForm Thickness: 9 in.  
 Short Leg Dimension = 19 in.  
 Long Leg Dimension = 31 in.

Outside Dimension	Inside Dimension	Inside Corner to Outside Corner Dimension
4' 2"	2' 8"	3' 5"
8' 2"	6' 8"	7' 5"
12' 2"	10' 8"	11' 5"
16' 2"	14' 8"	15' 5"
20' 2"	18' 8"	19' 5"
24' 2"	22' 8"	23' 5"
28' 2"	26' 8"	27' 5"
32' 2"	30' 8"	31' 5"
36' 2"	34' 8"	35' 5"
40' 2"	38' 8"	39' 5"
44' 2"	42' 8"	43' 5"
48' 2"	46' 8"	47' 5"
52' 2"	50' 8"	51' 5"
56' 2"	54' 8"	55' 5"
60' 2"	58' 8"	59' 5"
64' 2"	62' 8"	63' 5"
68' 2"	66' 8"	67' 5"
72' 2"	70' 8"	71' 5"
76' 2"	74' 8"	75' 5"
80' 2"	78' 8"	79' 5"
84' 2"	82' 8"	83' 5"
88' 2"	86' 8"	87' 5"
92' 2"	90' 8"	91' 5"
96' 2"	94' 8"	95' 5"
100' 2"	98' 8"	99' 5"
104' 2"	102' 8"	103' 5"

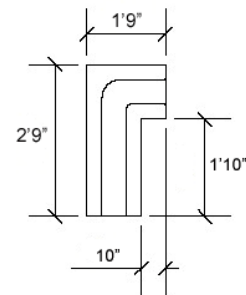
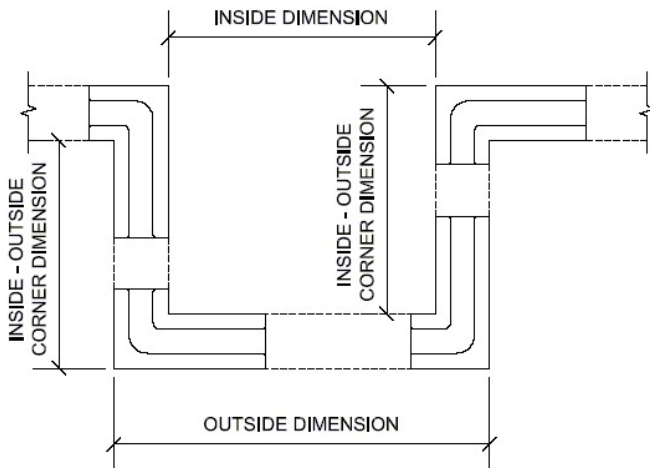




### Architectural Dimensions For 11" iForm Extended 90-Degree Corner

iForm Thickness: 11 in.  
 Short Leg Dimension = 21 in.  
 Long Leg Dimension = 33 in.

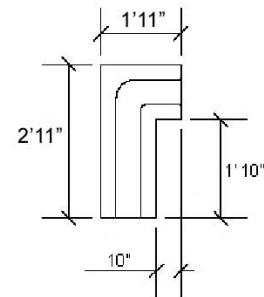
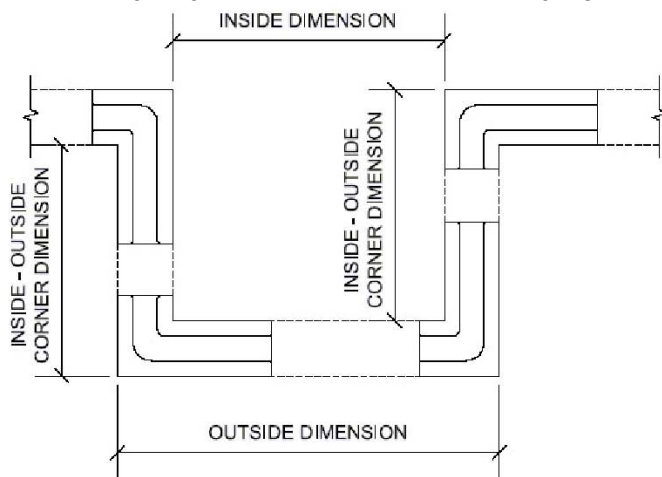
Outside Dimension	Inside Dimension	Inside Corner to Outside Corner Dimension
4' 6"	2' 8"	3' 7"
8' 6"	6' 8"	7' 7"
12' 6"	10' 8"	11' 7"
16' 6"	14' 8"	15' 7"
20' 6"	18' 8"	19' 7"
24' 6"	22' 8"	23' 7"
28' 6"	26' 8"	27' 7"
32' 6"	30' 8"	31' 7"
36' 6"	34' 8"	35' 7"
40' 6"	38' 8"	39' 7"
44' 6"	42' 8"	43' 7"
48' 6"	46' 8"	47' 7"
52' 6"	50' 8"	51' 7"
56' 6"	54' 8"	55' 7"
60' 6"	58' 8"	59' 7"
64' 6"	62' 8"	63' 7"
68' 6"	66' 8"	67' 7"
72' 6"	70' 8"	71' 7"
76' 6"	74' 8"	75' 7"
80' 6"	78' 8"	79' 7"
84' 6"	82' 8"	83' 7"
88' 6"	86' 8"	87' 7"
92' 6"	90' 8"	91' 7"
96' 6"	94' 8"	95' 7"
100' 6"	98' 8"	99' 7"
104' 6"	102' 8"	103' 7"



### Architectural Dimensions For 13" iForm Extended 90-Degree Corner

iForm Thickness: 13 in.  
 Short Leg Dimension = 23 in.  
 Long Leg Dimension = 35 in.

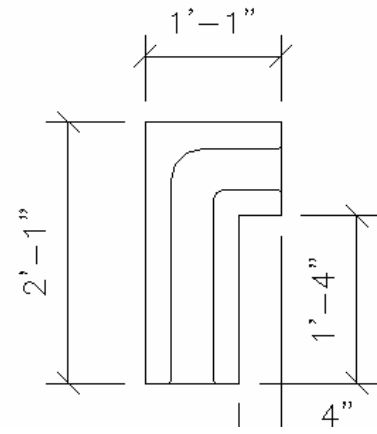
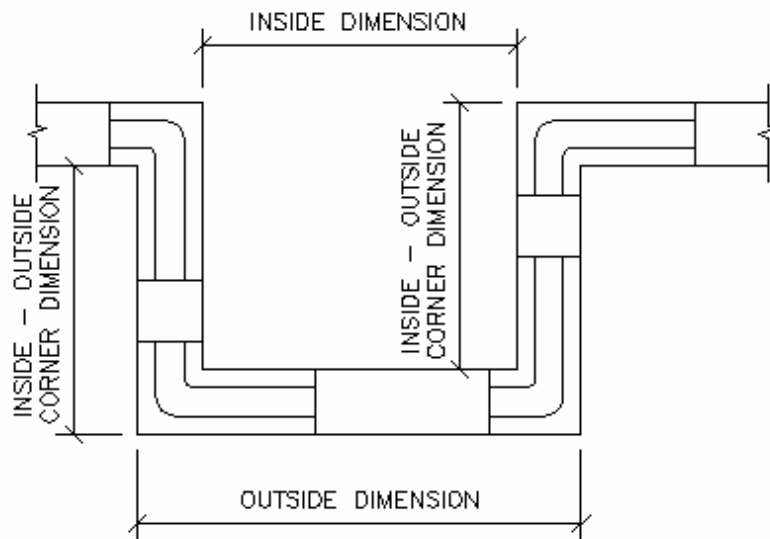
Outside Dimension	Inside Dimension	Inside Corner to Outside Corner Dimension
4' 10"	2' 8"	3' 9"
8' 10"	6' 8"	7' 9"
12' 10"	10' 8"	11' 9"
16' 10"	14' 8"	15' 9"
20' 10"	18' 8"	19' 9"
24' 10"	22' 8"	23' 9"
28' 10"	26' 8"	27' 9"
32' 10"	30' 8"	31' 9"
36' 10"	34' 8"	35' 9"
40' 10"	38' 8"	39' 9"
44' 10"	42' 8"	43' 9"
48' 10"	46' 8"	47' 9"
52' 10"	50' 8"	51' 9"
56' 10"	54' 8"	55' 9"
60' 10"	58' 8"	59' 9"
64' 10"	62' 8"	63' 9"
68' 10"	66' 8"	67' 9"
72' 10"	70' 8"	71' 9"
76' 10"	74' 8"	75' 9"
80' 10"	78' 8"	79' 9"
84' 10"	82' 8"	83' 9"
88' 10"	86' 8"	87' 9"
92' 10"	90' 8"	91' 9"
96' 10"	94' 8"	95' 9"
100' 10"	98' 8"	99' 9"
104' 10"	102' 8"	103' 9"



### Architectural Dimensions for 9" Standard 90-Degree Corner

iForm Thickness : 9 in.  
 Short Leg Dimension = 13 in.  
 Long Leg Dimension = 25 in.

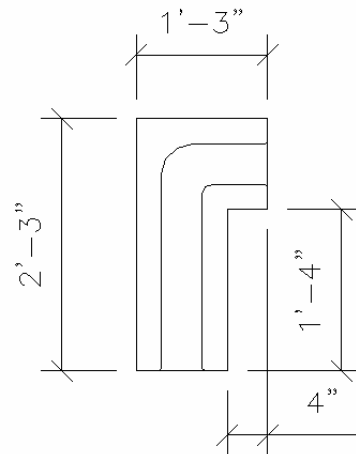
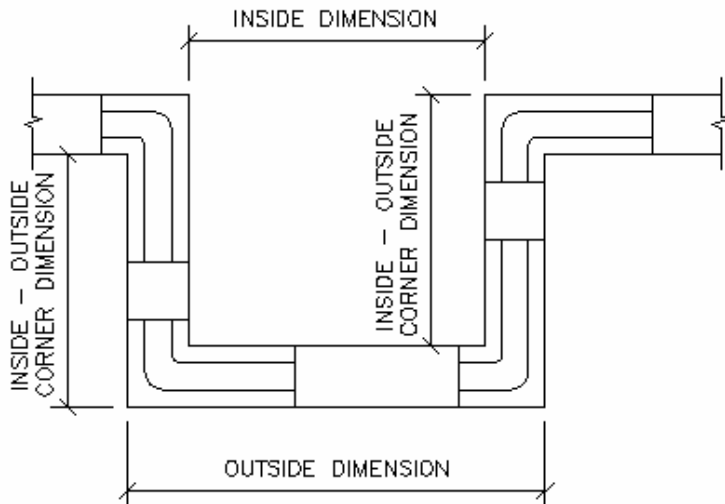
Outside Dimension	Inside Dimension	Inside Corner to Outside Corner Dimension
3' 2"	1' 8"	2' 5"
7' 2"	5' 8"	6' 5"
11' 2"	9' 8"	10' 5"
15' 2"	13' 8"	14' 5"
19' 2"	17' 8"	18' 5"
23' 2"	21' 8"	22' 5"
27' 2"	25' 8"	26' 5"
31' 2"	29' 8"	30' 5"
35' 2"	33' 8"	34' 5"
39' 2"	37' 8"	38' 5"
43' 2"	41' 8"	42' 5"
47' 2"	45' 8"	46' 5"
51' 2"	49' 8"	50' 5"
55' 2"	53' 8"	54' 5"
59' 2"	57' 8"	58' 5"
63' 2"	61' 8"	62' 5"
67' 2"	65' 8"	66' 5"
71' 2"	69' 8"	70' 5"
75' 2"	73' 8"	74' 5"
79' 2"	77' 8"	78' 5"
83' 2"	81' 8"	82' 5"
87' 2"	85' 8"	86' 5"
91' 2"	89' 8"	90' 5"
95' 2"	93' 8"	94' 5"
99' 2"	97' 8"	98' 5"
103' 2"	101' 8"	102' 5"



### Architectural Dimensions for 11" Standard 90-Degree Corner

Form thickness 11 in.  
 Short Dimension 15 in.  
 Long Dimension 27 in.

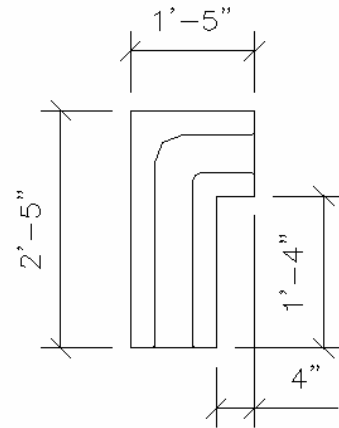
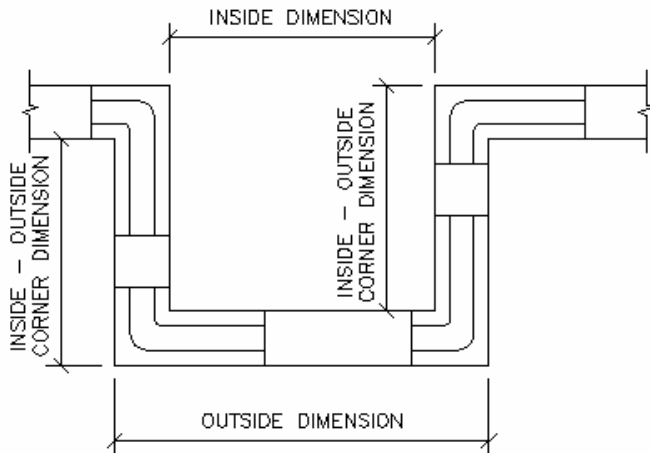
Outside Dimension	Inside Dimension	Inside Corner to Outside Corner Dimension
3' 6"	1' 8"	2' 7"
7' 6"	5' 8"	6' 7"
11' 6"	9' 8"	10' 7"
15' 6"	13' 8"	14' 7"
19' 6"	17' 8"	18' 7"
23' 6"	21' 8"	22' 7"
27' 6"	25' 8"	26' 7"
31' 6"	29' 8"	30' 7"
35' 6"	33' 8"	34' 7"
39' 6"	37' 8"	38' 7"
43' 6"	41' 8"	42' 7"
47' 6"	45' 8"	46' 7"
51' 6"	49' 8"	50' 7"
55' 6"	53' 8"	54' 7"
59' 6"	57' 8"	58' 7"
63' 6"	61' 8"	62' 7"
67' 6"	65' 8"	66' 7"
71' 6"	69' 8"	70' 7"
75' 6"	73' 8"	74' 7"
79' 6"	77' 8"	78' 7"
83' 6"	81' 8"	82' 7"
87' 6"	85' 8"	86' 7"
91' 6"	89' 8"	90' 7"
95' 6"	93' 8"	94' 7"
99' 6"	97' 8"	98' 7"
103' 6"	101' 8"	102' 7"



### Architectural Dimensions for 13" Standard 90-Degree Corner

Form thickness 13 in.  
 Short Dimension 17 in.  
 Long Dimension 29 in.

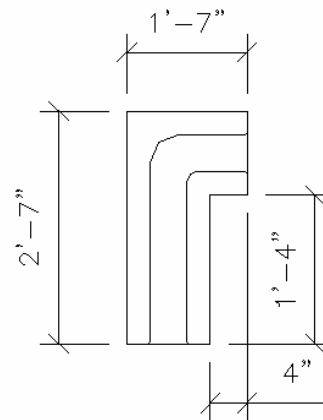
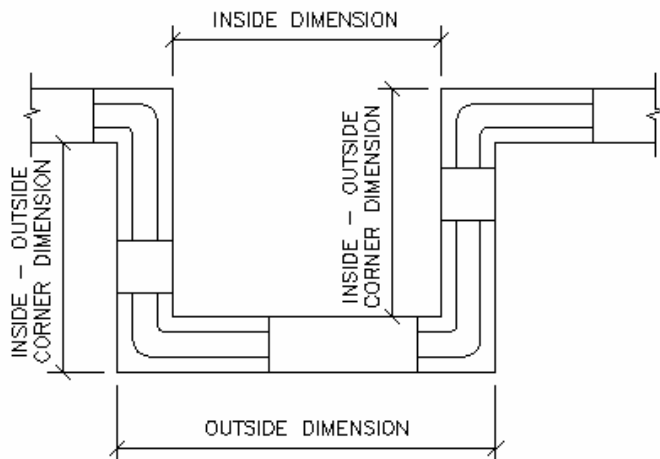
Outside Dimension	Inside Dimension	Inside Corner to Outside Corner Dimension
3' 10"	1' 8"	2' 9"
7' 10"	5' 8"	6' 9"
11' 10"	9' 8"	10' 9"
15' 10"	13' 8"	14' 9"
19' 10"	17' 8"	18' 9"
23' 10"	21' 8"	22' 9"
27' 10"	25' 8"	26' 9"
31' 10"	29' 8"	30' 9"
35' 10"	33' 8"	34' 9"
39' 10"	37' 8"	38' 9"
43' 10"	41' 8"	42' 9"
47' 10"	45' 8"	46' 9"
51' 10"	49' 8"	50' 9"
55' 10"	53' 8"	54' 9"
59' 10"	57' 8"	58' 9"
63' 10"	61' 8"	62' 9"
67' 10"	65' 8"	66' 9"
71' 10"	69' 8"	70' 9"
75' 10"	73' 8"	74' 9"
79' 10"	77' 8"	78' 9"
83' 10"	81' 8"	82' 9"
87' 10"	85' 8"	86' 9"
91' 10"	89' 8"	90' 9"
95' 10"	93' 8"	94' 9"
99' 10"	97' 8"	98' 9"
103' 10"	101' 8"	102' 9"



### Architectural Dimensions for 15" Standard 90-Degree Corner

iForm Thickness : 15 in.  
 Short Leg Dimension = 19 in.  
 Long Leg Dimension = 31 in.

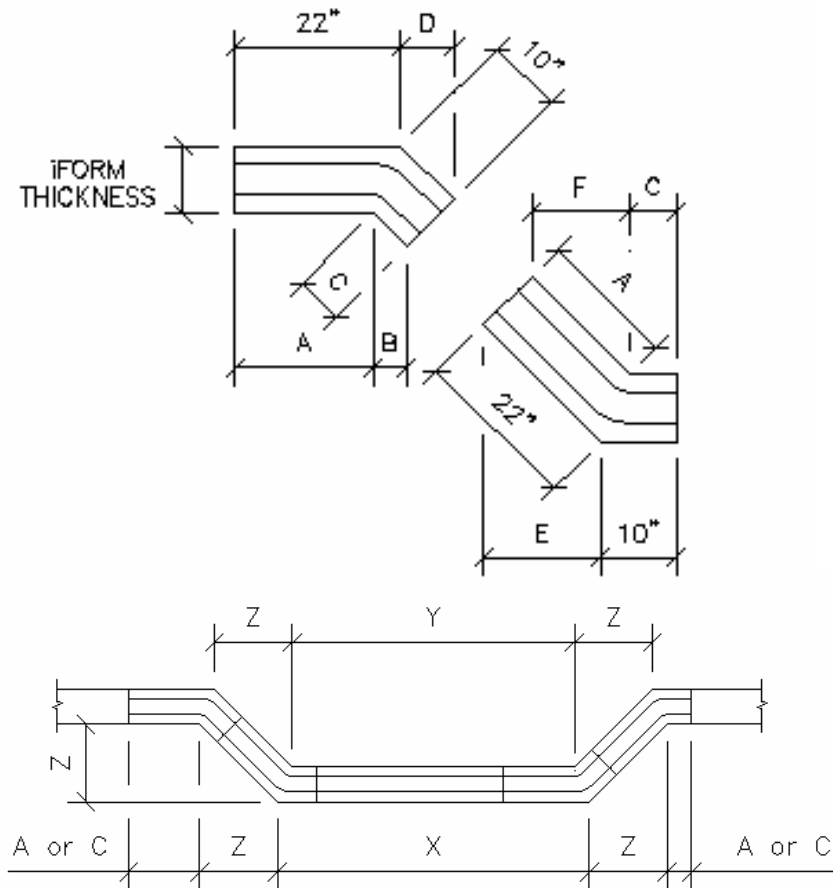
Outside Dimension	Inside Dimension	Inside Corner to Outside Corner Dimension
4' 2"	1' 8"	2' 11"
8' 2"	5' 8"	6' 11"
12' 2"	9' 8"	10' 11"
16' 2"	13' 8"	14' 11"
20' 2"	17' 8"	18' 11"
24' 2"	21' 8"	22' 11"
28' 2"	25' 8"	26' 11"
32' 2"	29' 8"	30' 11"
36' 2"	33' 8"	34' 11"
40' 2"	37' 8"	38' 11"
44' 2"	41' 8"	42' 11"
48' 2"	45' 8"	46' 11"
52' 2"	49' 8"	50' 11"
56' 2"	53' 8"	54' 11"
60' 2"	57' 8"	58' 11"
64' 2"	61' 8"	62' 11"
68' 2"	65' 8"	66' 11"
72' 2"	69' 8"	70' 11"
76' 2"	73' 8"	74' 11"
80' 2"	77' 8"	78' 11"
84' 2"	81' 8"	82' 11"
88' 2"	85' 8"	86' 11"
92' 2"	89' 8"	90' 11"
96' 2"	93' 8"	94' 11"
100' 2"	97' 8"	98' 11"
104' 2"	101' 8"	102' 11"



### Architectural Dimensions for 9" 45-Degree Corner

iForm:	9 in.
Long Leg Dimension =	22 in.
Short Leg Dimension =	10 in.
A =	18.272 in.
B =	4.435 in.
C =	6.272 in.
D =	7.071 in.
E =	15.556 in.
F =	12.920 in.

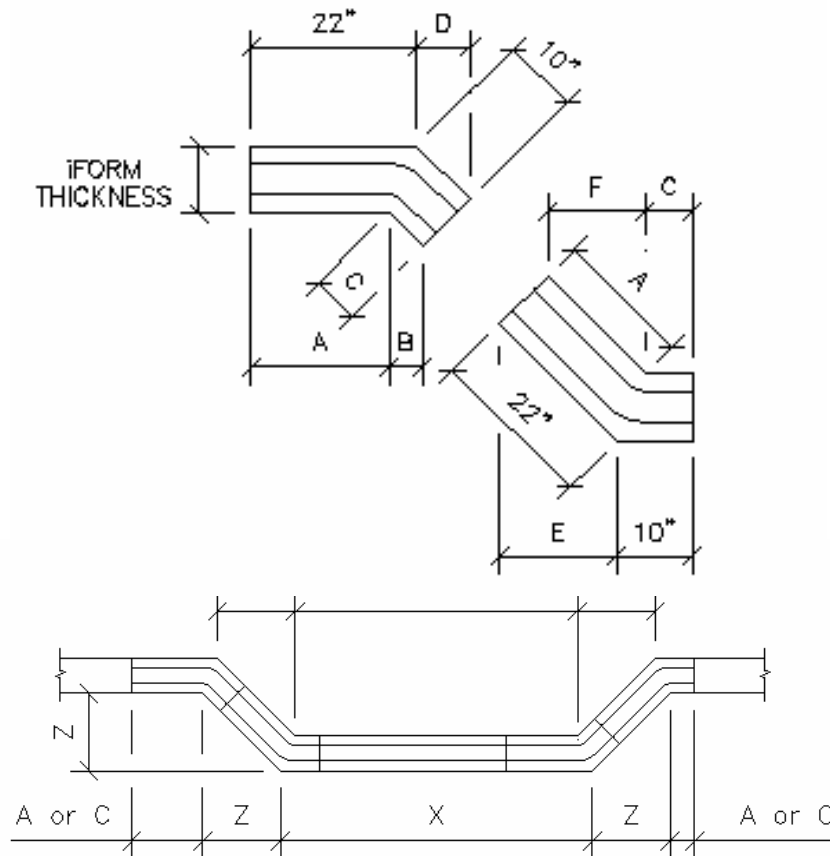
Exterior Bay Face X (in.)	Interior Bay Face Y (in.)	Bay Projection Z (in.)
32	24.544	19.991
80	72.544	53.933
128	120.544	87.874
176	168.544	121.815
224	216.544	155.756



### Architectural Dimensions for 11" 45-Degree Corner

iForm:	11 in.
Long Leg Dimension =	22 in.
Short Leg Dimension =	10 in.
A =	17.444 in.
B =	3.849 in.
C =	5.444 in.
D =	7.071 in.
E =	15.556 in.
F =	12.335 in.

Exterior Bay Face X (in.)	Interior Bay Face Y (in.)	Bay Projection Z (in.)
32	22.887	19.406
80	70.887	53.347
128	118.887	87.288
176	166.887	121.229
224	214.887	155.170

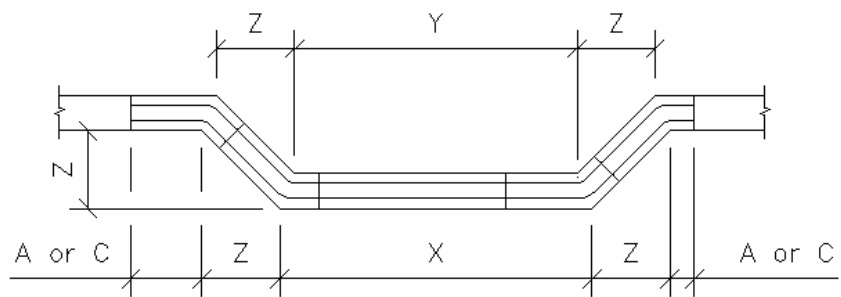
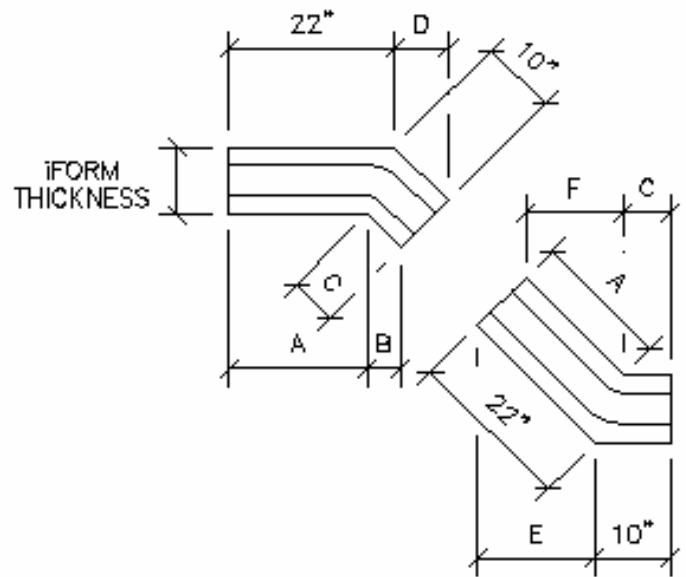




### Architectural Dimensions for 13" 45-Degree Corner

iForm:	13 in.
Long Leg Dimension =	22 in.
Short Leg Dimension =	10 in.
A =	16.615 in.
B =	3.263 in.
C =	4.615 in.
D =	7.071 in.
E =	15.556 in.
F =	11.749 in.

Exterior Bay Face X (in.)	Interior Bay Face Y (in.)	Bay Projection Z (in.)
32	21.230	18.820
80	69.230	52.761
128	117.230	86.702
176	165.230	120.643
224	213.230	154.584



**SECTION 03 11 19**

Reward ver.

**PERMANENT FORMS - INSULATING CONCRETE FORMS (ICF's)****PART 1 GENERAL****1.01 SUMMARY**

- A. Supply and install Reward Wall Systems stay-in-place insulating concrete forms for structural cast-in-place concrete walls. Includes the installation of concrete steel reinforcement and the placement of concrete within the insulating concrete forms.
- B. Cast-in-place concrete walls include the construction of the following:
  - 1. Exterior and interior walls
  - 2. Basement and above grade walls
  - 3. Commercial and residential walls
  - 4. Load bearing and non-load bearing walls
- C. Bracing and scaffolding to be provided to comply with all applicable codes.

**1.02 WORK INCLUDED**

- A. Provide labor, materials, tools and equipment for the installation of the Reward insulating concrete form manufactured by Reward Wall Systems, Inc. 9931 South 136<sup>th</sup> Street, Suite 100, Omaha, NE 68138, (402) 592-7077.
- B. Provide labor to install the steel reinforcement and to place concrete into the Insulating concrete forms.

**1.03 PRODUCTS INSTALLED BUT NOT SUPPLIED UNDER THIS SECTION**

- A. Steel Reinforcement
- B. Concrete
- C. Window and Door Opening Bucks
- D. Anchor Bolts, Sleeves and Inserts
- E. Penetrations

**1.04 SUBMITTALS**

- A. Product Data: Submit manufacturer's product data and installation instructions.
- B. Code Compliance Data: Submit relevant code compliance data.
- C. Drawings and Calculations: Submit project drawings, details of construction, and structural calculations as required by the local building department.
- D. Steel Reinforcement and Concrete: Submit the reinforcement schedule and concrete mix design as proposed for use.

**1.05 QUALITY ASSURANCE**

- A. Comply with applicable governing codes and regulations.
- B. Follow manufacturer's training and installation procedures.
- C. Contractor is responsible for proper construction and placement of forms, steel reinforcement and concrete.
- D. Installation to comply with the project drawings and calculations.
- E. Material in contact with the insulating concrete form must be compatible with expanded polystyrene.
- F. Standards:
  - 1. ACI 301 Standard Specifications for Structural Concrete
  - 2. ACI 318 Building Code Requirements for Structural Concrete
  - 3. ACI 332 Guide to Residential Cast-in-Place Concrete Construction
  - 4. ASTM C 94 28-Day Concrete Compressive Strength
  - 5. ASTM C 150 Portland Cement
  - 6. ASTM C 33 Normal Weight Aggregates
  - 7. ASTM C 330 Light Weight Aggregates
  - 8. ASTM C618 Fly Ash
  - 9. ASTM A615 Steel Specifications for Steel Reinforcement
  - 10. ASTM A185 Steel Wire Fabric Specifications
  - 11. ASTM E84 Surface Burning Characteristics of Building Materials

**1.06 SYSTEM DESCRIPTION**

- A. Insulating concrete form consists of two panels of expanded polystyrene nominal density 1.5 lbs/ft<sup>3</sup> connected by plastic ties.
- B. The iForm provides either a 9", 11", 13", 15" or 17" overall wall section thickness. The iForm concrete cross section provides a 4", 6", 8", 10" or 12" "flat" core respectively.
- C. The iForm has plastic ties recessed 1/2" behind each face of expanded polystyrene and located 6" o.c. The plastic ties provide 1 1/4" wide furring strip the full height of wall to fasten exterior and interior finishes.
- D. The iForm wall system provides a calculated R-22 insulation value.
- E. The wall system provides fire resistance ratings and superior sound attenuation values.

**1.07 RELATED SECTIONS**

- A. Section 03 05 00 Common Work Results for Concrete
- B. Section 03 10 00 Concrete Forms and Accessories
- C. Section 03 20 00 Concrete Reinforcing
- D. Section 03 30 00 Cast-In-Place Concrete
- E. Section 03 40 00 Precast Concrete

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F. Section 04 00 00	Masonry
G. Section 06 00 00	Wood, Plastics and Composites
H. Section 07 10 00	Dampproofing and Waterproofing
I. Section 07 13 00	Sheet Waterproofing
J. Section 07 24 00	Exterior Insulation Finish Systems
K. Section 07 46 00	Siding
L. Section 07 60 00	Flashing and Sheet Metal
M. Section 08 00 00	Openings
N. Section 09 20 00	Plaster and Gypsum Board
O. Section 09 70 00	Wall Finishes

### **1.08 DELIVERY, STORAGE AND HANDLING**

- A. Deliver the product in original factory packaging with product listing label and manufacturing label.
- B. Handle and store the product to prevent damage and deterioration.
- C. Protect from prolonged exposure to the sunlight's UV rays.

### **1.09 PROJECT CONDITIONS**

- A. Follow manufacturer's requirements for protection and placement of concrete during construction periods when the weather is below the minimum specified by the building codes to ensure proper curing conditions.

### **1.10 CONSTRUCTION SCHEDULES**

- A. Coordinate the delivery of materials and construction schedules for all related materials and sub-contractors that require attachment of components to formwork.

### **1.11 WARRANTY**

- A. Contact the manufacturer for a written copy of product warranty.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURER**

- A. Reward Wall Systems, Inc.  
9931 South 136<sup>th</sup> Street, Suite 100  
Omaha, NE 68138  
Phone: (402) 592-7077 Fax: (402) 592-7969  
E-mail: [reward@rewardwalls.com](mailto:reward@rewardwalls.com)  
[www.rewardwalls.com](http://www.rewardwalls.com)

**2.02 MATERIALS**

## A. Insulating concrete forms manufactured by Reward Wall Systems, Inc.

iForm

- a. 9" (4" concrete core) Form – 48"L x 9"W x 16"H
- b. 11" (6" concrete core) Form - 48"L x 11"W x 16"H
- c. 13" (8" concrete core) Form - 48"L x 13"W x 16"H
- d. 15" (10" concrete core) Form – 48"L x 15"W x 16"H
- e. 17" (12" concrete core) Form – 48"L x 15"W x 16"H
- f. 9" 90 Degree Corner Form (Universal Left and Right)
- g. 11" 90 Degree Corner Form (Universal Left and Right)
- h. 13" 90 Degree Corner Form (Universal Left and Right)
- i. 15" 90 Degree Corner Form (Universal Left and Right)
- j. 17" 90 Degree Corner Form (Universal Left and Right)
- k. 9" 45 Degree Corner Form
- l. 11" 45 Degree Corner Form
- m. 13" 45 Degree Corner Form
- n. 11" Ledge Form
- o. 13" Ledge Form
- p. 11" Taper Top Form
- q. 13" Taper Top Form
- r. 11" T-Form

## B. Concrete

1. Concrete supplied under Section 03 30 00 shall meet the compressive strength requirement as specified by the design engineer.
2. Recommended concrete mix shall include a concrete slump of 5.5" to 6.5" with an aggregate size no greater than 1/2" for the 11" and 13" iForms; a concrete slump of 6.5" to 7" with an aggregate size of no greater than 3/8" for the 9" iForm; and a concrete slump of 4" to 5.5" and an aggregate size no greater than 3/4" for the 15" and 17" iForm.

## C. Steel Reinforcement

1. Steel reinforcement shall be supplied and placed in the formwork as specified by the design engineer or prescriptive reinforcement tables.

## D. Auxiliary Materials

1. Sufficient bracing, wall alignment and scaffolding
2. Waterproofing materials for below grade applications
3. Exterior finishes
4. Interior finish must meet code requirement for 15 minute thermal barrier
5. Door and window opening bucks
6. Penetration and sleeve material
7. Anchors and anchor bolts

**PART 3 EXECUTION**

**3.01 INSPECTION**

- A. Verify all items in the Work Included section and verify site conditions.
- B. Verify footings are installed within +/- 1/4" of level and step footings are 16" in height.
- C. Verify steel reinforcement vertical dowels are in place as specified by design.

**3.02 PREPARATION**

- A. Clean top of footings and organize materials and equipment before starting formwork.

**3.03 INSTALLATION**

- A. Installation of forms and contractors work must be in accordance to manufacturer's installation manual and training procedures including:
  - 1. Placement of Reward forms
  - 2. Steel reinforcement placement
  - 3. Concrete placement
  - 4. Door and window opening construction
  - 5. Bracing, scaffolding and wall alignment
  - 6. Anchors, anchor bolts, penetrations
  - 7. Final pre-pour checklist

**3.04 FIELD QUALITY CONTROL**

- A. Ensure that the cast-in-place concrete walls are level, plumb, square and straight and that all dimensions conform to the drawings.

**3.05 CLEANUP**

- A. Clean up and dispose of all debris on job site related to the installation of the insulating concrete forms.

**END OF SECTION**