CONSTRUCTION GUIDE

INSULATED CONCRETE FORM (ICF-15)

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SOCIAL MIDIA

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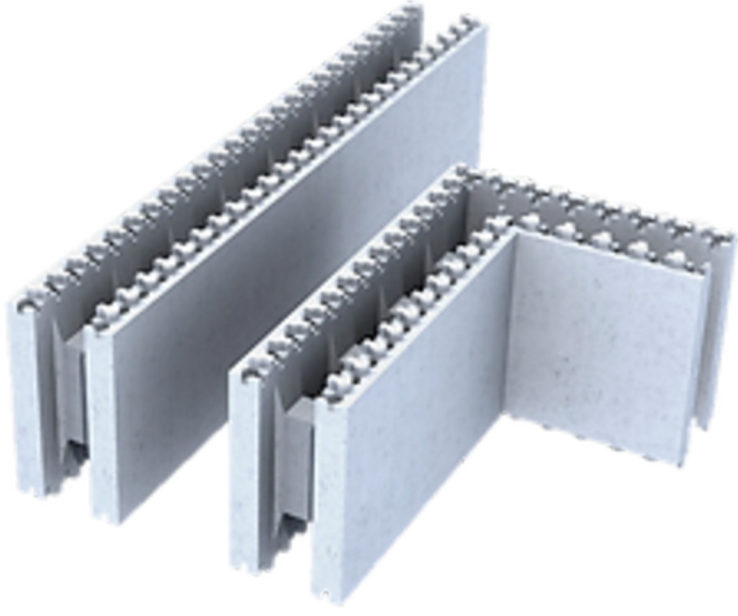
KNOWING THE SYSTEM

ICF-15
Structural
Thermo-acoustic
Wall System



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GENERAL INFORMATION
INSULATED CONCRETE FORM (ICF-15)

Thermo-acoustic Wall System

The ICF-15 Thermal Wall System is an insulated concrete form (ICF), within the Post and Beam ICF category, that combines the strength of reinforced concrete with the thermal and acoustic insulation of expanded polystyrene (EPS).

It is designed to provide faster construction, superior light weight structural integrity, long-term energy efficiency and maintenance free longevity.

The system consists of interlocking EPS blocks that create walls, which are then filled with reinforced concrete (concrete and steel rebar).

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ADVANTAGES OF THE SYSTEM
INSULATED CONCRETE FORM (ICF-15)

1. **Structural Resistance**
    a. Reinforced concrete core designed to withstand seismic activity and strong winds.
2. **Thermal Efficiency**
    a. Continuous insulation that reduces the need for air conditioning or heating.
3. **Acoustic Insulation**
    a. The concrete core and EPS panel and connection system minimize exterior noise.
4. **Fast Construction**
    a. Interlocking panels make assembly simple and quick.
5. **Durability**
    a. Resistant to pests, moisture, and fire.
6. **Design Versatility**
    a. Can adapt to any architectural design.

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CONSTRUCTION PROCESS
INSULATED CONCRETE FORM (ICF-15)

Step 1 – Foundation Preparation

- Build the foundation slab or footing according to the structural plans.
- Place starter rebars that will anchor the walls.

Step 2 – Panel Assembly

- Position the first row of panels on the foundation.
- Verify alignment and interlock the panels together.
- Place vertical rebars inside the cavities.

Step 3 – Panel Continuation and Reinforcement

- Continue placing panels row by row until the desired height is reached.
- Add horizontal rebars as indicated in the structural design.
- Ensure correct overlap of steel at joints.

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CONSTRUCTION PROCESS
INSULATED CONCRETE FORM (ICF-15)

Step 4 – Alignment and Bracing

- Install temporary braces to ensure the walls remain vertical and plumb.
- Check levels before pouring concrete.

Step 5 – Concrete Pouring

- Pour concrete in lifts of approximately 1 meter.
- Vibrate each lift to ensure proper consolidation.
- Continue until the wall is completely filled.

Step 6 – Electrical and Plumbing Installations

- Cut channels into the EPS using simple tools such as a hot knife.
- Install conduits and pipes directly into the EPS panels.

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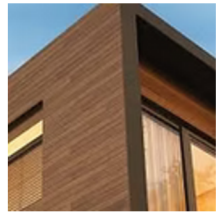
CONSTRUCTION PROCESS
INSULATED CONCRETE FORM (ICF-15)

Step 7 – Wall Finishes

- Interior: Apply plaster, drywall, or any desired interior finish.
- Exterior: Stucco, stone veneer, siding, real stone, or any type of finish you can use in any other construction system.







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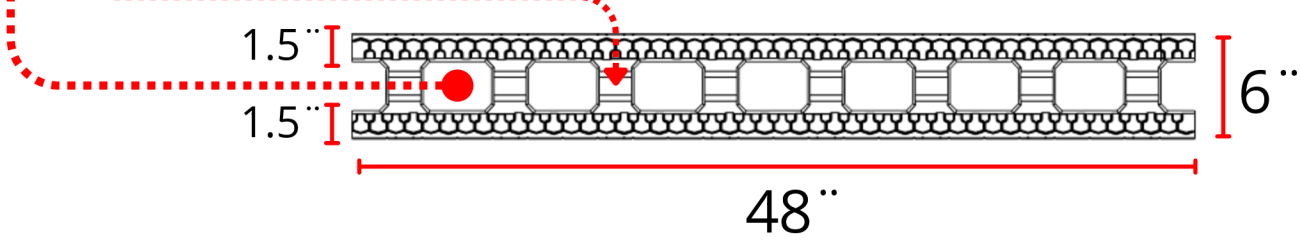
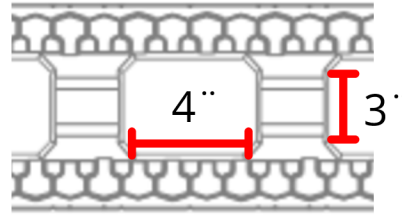
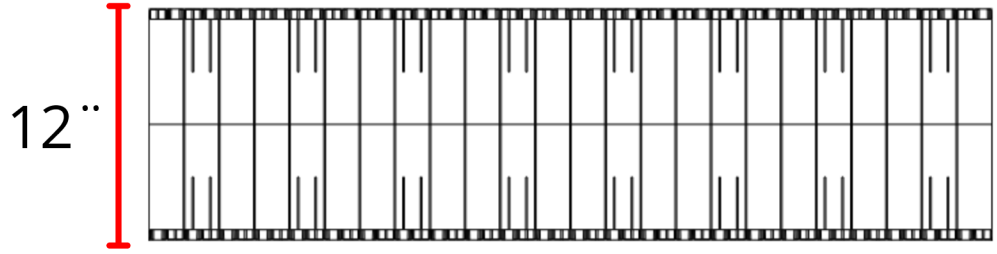
TECNICAL SPECIFICATIONS
INSULATED CONCRETE FORM (ICF-15)

- **Linear Block Dimensions:**
  - Length: 122 cm (48 inches) x Height: 30 cm (12 inches) x Width: 15 cm (6 inches)
  - Concrete Core: 8 cm (3 inches) x 10 cm (4 inches)
  - EPS Core Panel Connection System: 8 cm (3 inches) x 5.25 cm (2 inches)







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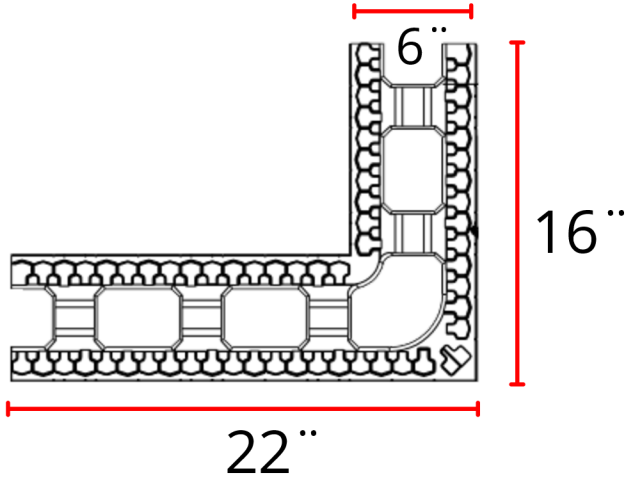
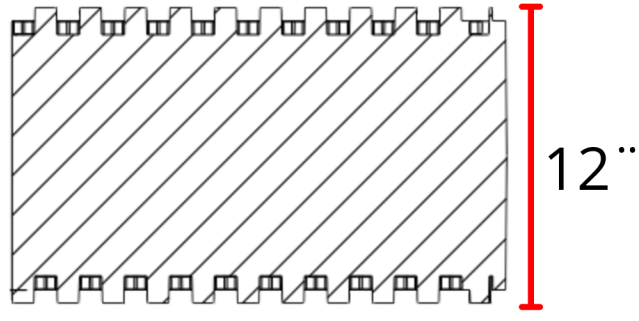
TECNICAL SPECIFICATIONS
INSULATED CONCRETE FORM (ICF-15)

- **Corner Block (reversible):**
  - Length: 56 cm (22 inches) + 40 cm (16 inches) x Height: 30 cm (12 inches) x Width: 15 cm (6 inches)
  - Core: 8 cm (3 inches) x 10 cm (4 inches)
  - EPS Core Panel Connection System: 8 cm (3 inches) x 5.25 cm (2 inches)





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TECNICAL SPECIFICATIONS
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- **R value: R-24 (24 hrs of insulation).**
- **Square feet per ICF Block: 3.94 sqft**
- **Concrete per Square Meter: 0.0.55 m³ (3.53 cubic feet)**
- **Concrete Type: f'c 200 kg/cm² (aggregate: 3/8" or smaller seal or gravel | slump of 15cm to 18cm)**
- **Rebar per Square Meter: #3 and #4 on average - 3 kg (6.61 Lbs)**
- **Maximum Pour Height: 3 courses or 36¨**

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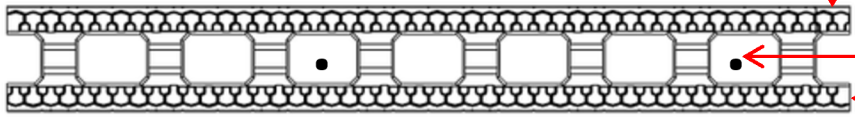
ICF-15 STRAIGHT BLOCK

• No.3 Rebar @61 cm & double up around doors & windows or whatever the structural plans call for.

Lego like Interlocking System

Concrete Core & Installations space (3¨X 4¨)

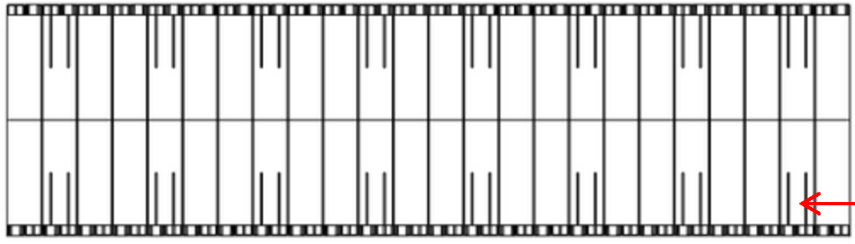
Insulation Panel on both sides (1.5¨)



Top View

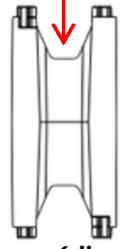
48¨

12¨



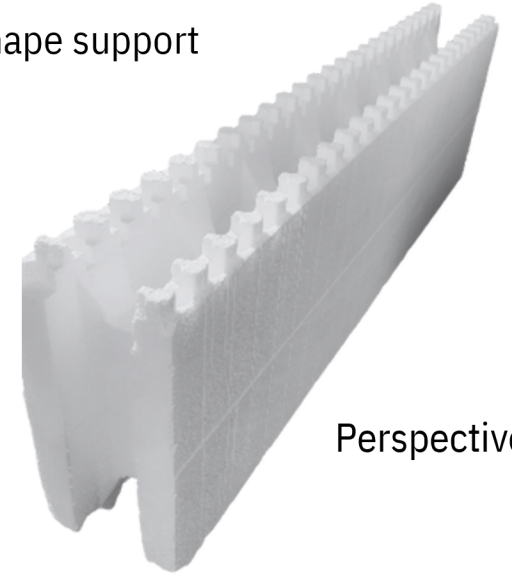
Side View

V shape support



6¨

Front View



Perspective

Marks on Panel

To know the parts of our block helps us understand why it's made this way and makes our job simpler!

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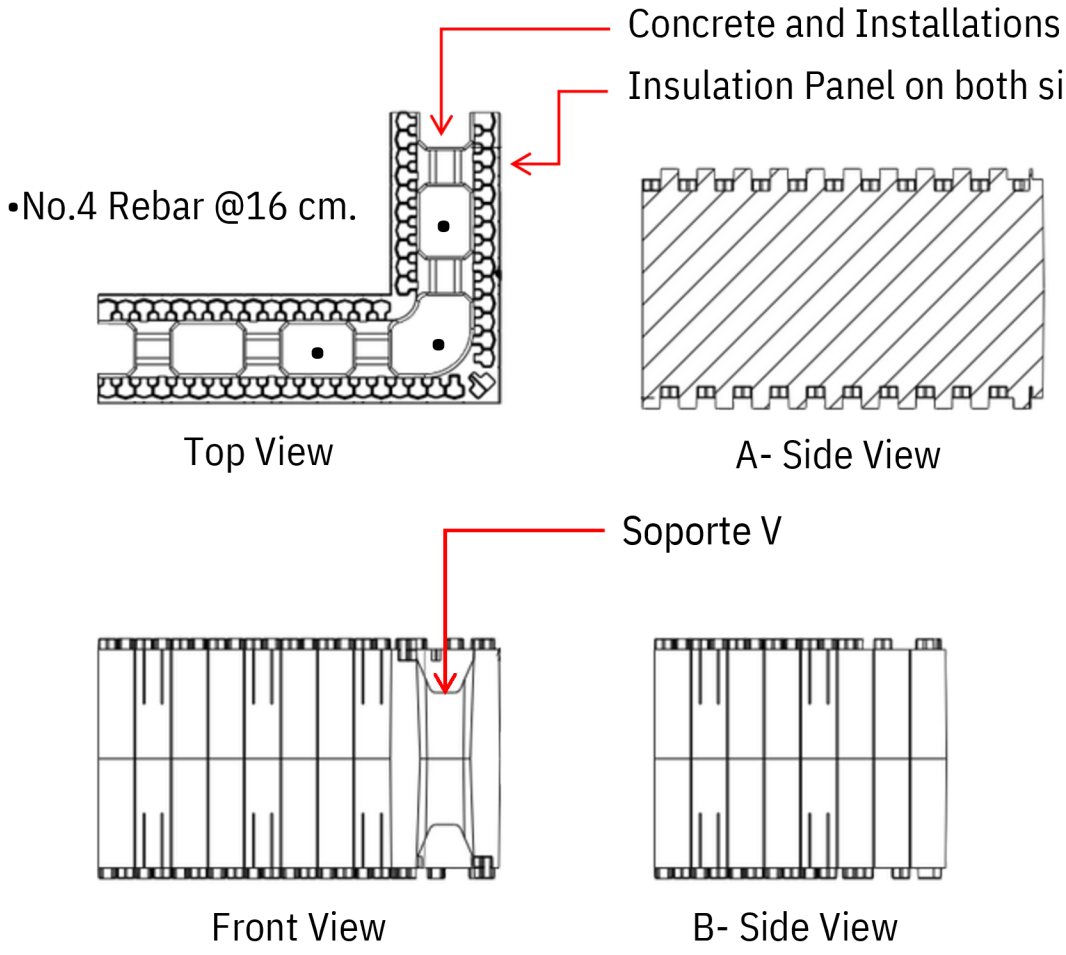
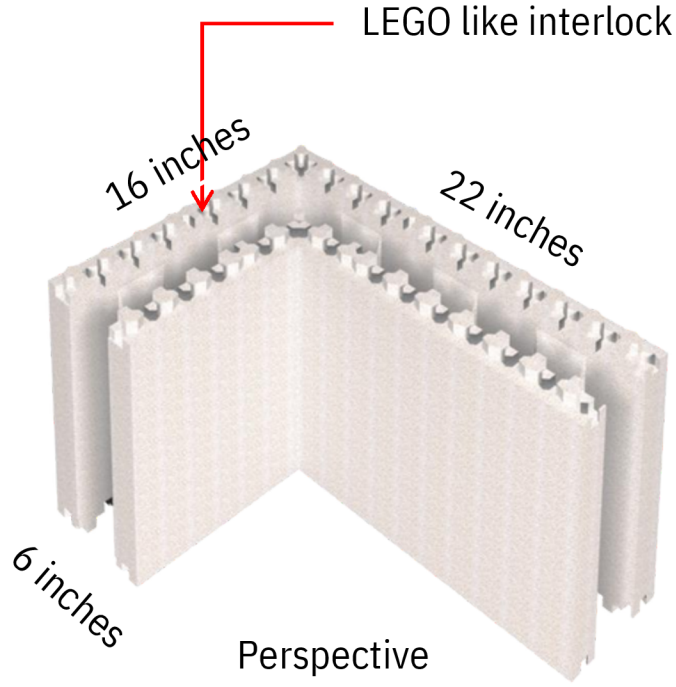
ICF-15 CORNER REVERSIBLE BLOCK





For the corner block design, the same details as the linear block apply. However, since it is a corner, the rebar must be placed in the three holes that form the corner (•). These should be No. 4 rebar, or two 3/8" rebars can be used in each cavity instead.

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5 STEPS FOR BUILDING AN ICF HOUSE

STEP #1	STEP #2	STEP #3	STEP #4	STEP #5
FOUNDATION	**WALLS**	**WALLS**	**ROOF SLAB**	**FINISHES**
Place No. #3 @ every 61cm for initial wall installation	Set the first two or three courses of ICF blocks	Set the door bucks	Place Bracing System	Prepare Walls and apply Fiberglass Mesh
No. 4 Rebar @ 16 cm at corners	Continue with No. 3 Rebar on verticals	Set the window bucks	Install Roof System	Apply basecoat
Plumbing Install	use No. 3 Rebar for the horizontal belts on every course	Check Plumbing and Elec	Install Electrical and Plumbing	Apply finish coat
Drainage outlets	Use No. 3Rebar for 90-degree angles on every corner	Continue 3 more courses of ICF	Pour Concrete	For interiors use plaster or drywall
Receptacles	Check the vertical level	Verify Vertical Level	Clean area	Coat of fine finish in exterior
Special Installations	Check the Horizontal level	Verify Horizontal Level	Wait for concrete to dry	You may apply any type of finish you want
Slab on grade	Pour concrete every 2 to 3 courses	Continue until desired Height	Remove Bracing	Paint

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STEP #1: FOUNDATION

Pre-Pouring Considerations
Before beginning the project, the following points must be considered:

- Water table
- Soil mechanics
- Special load cases
- Grading/Leveling

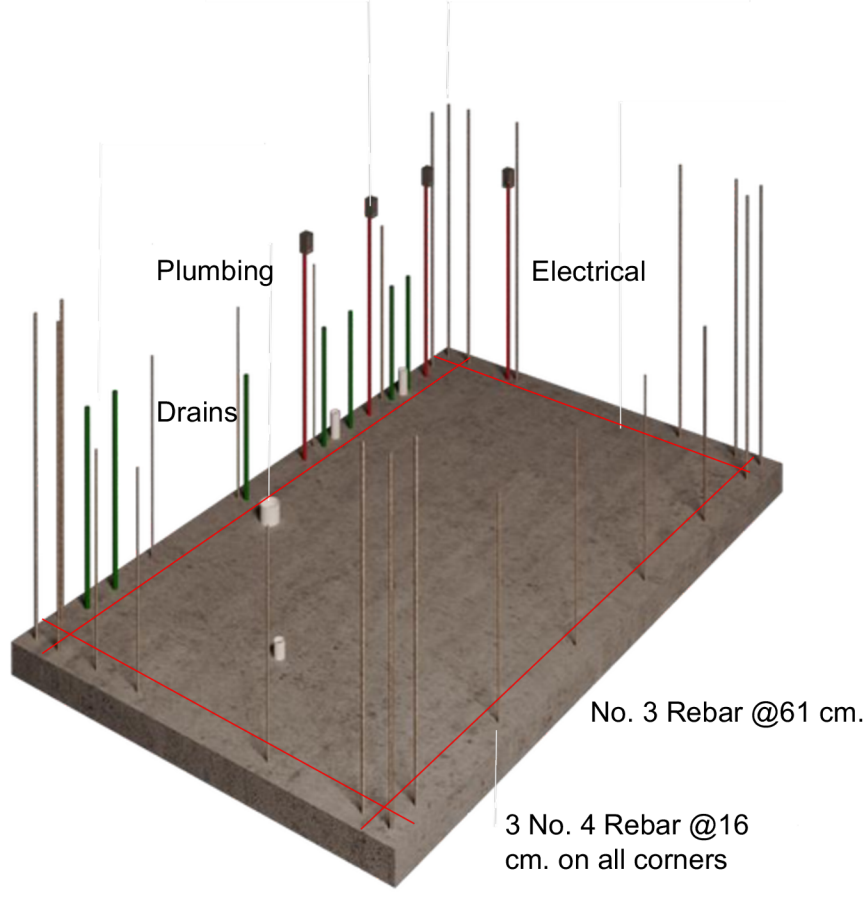
The slab pour must be at least 12 cm thick, with No. 3 corrugated rebar in both directions and F'c:200 Kg/cm2 concrete.

Rebar and Concrete

Based on each project's design, the concrete's strength may vary. Vertical starter bars are left with No. 3 rebar at 61 cm, along the length of the walls and at all corners or wall intersections with No. 4 rebar at 16 cm.

After the concrete is poured, the utilities and rebar will be ready to receive the ICF blocks. Use reference lines for the layout, as clearly shown in the image in red.

If you are missing vertical starter bars, you can install them by drilling into the slab or footing to a depth of 15 cm and anchoring them with an epoxy chemical bond. Remember that there must be dowels placed on the sides of doors and windows.



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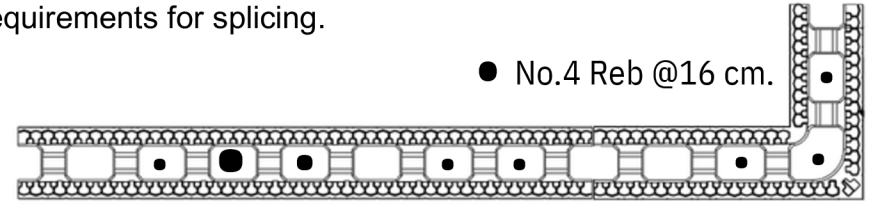
STEP #2: WALLS

To begin the installation of the first course of ICF blocks, you'll need to cut off the bottom interlocking part of the system (the "teeth") using a hot knife (a tool for cutting expanded polystyrene) or a utility knife. This allows the ICF block to sit as flat as possible on the concrete slab.

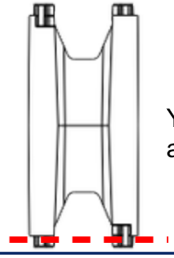
It's recommended to only place two courses at a time and pour the concrete for just the bottom "one and a half" courses. As you gain more experience, you can add more courses at once, while continuously ensuring they are plumb and levelusing tools like a level, string line, and plumb bob.

The concrete proportion should be 1:2:3:1—cement + sand + gravel 3/8" or smaller (seal) + water.

The structural system must include horizontal rebar rings that will be placed in every course or every two courses (60 cm). All vertical rebar will continue up to the parapet, with both types meeting the minimum requirements for splicing.

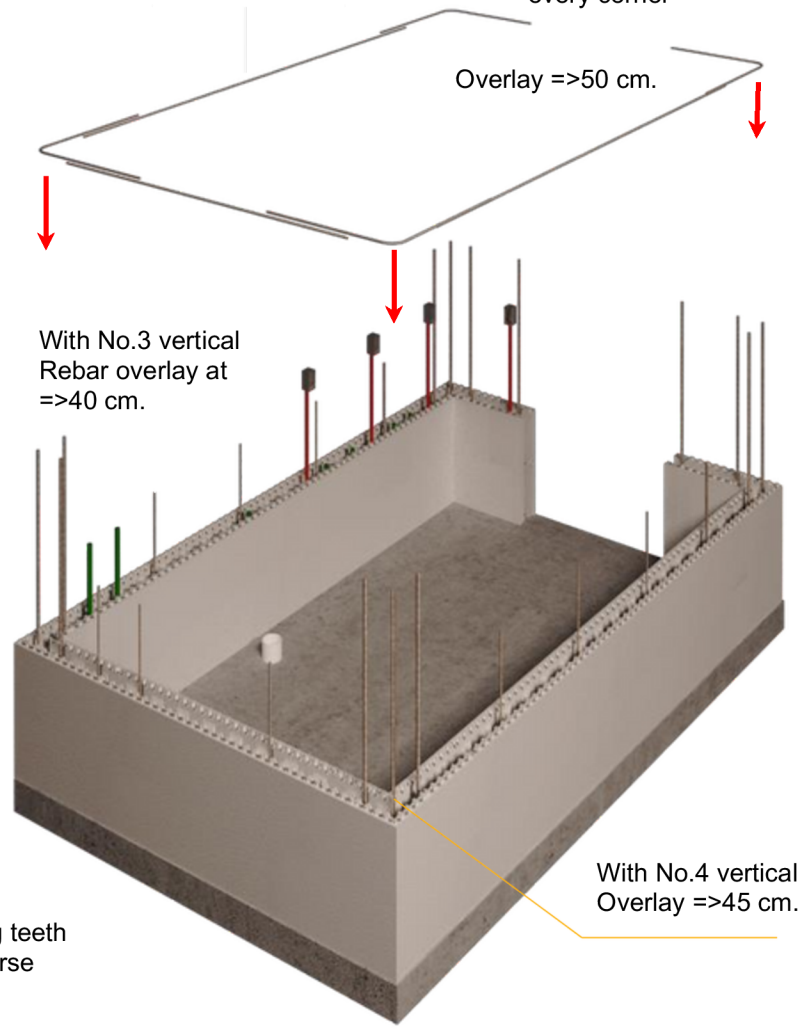


- No.3 Reb @61 cm.
- Green plumbing
- Drains with 2” PVC.
- Electrical



You may cut the interlocking teeth at the bottom of the first course

Horizontal Rebar



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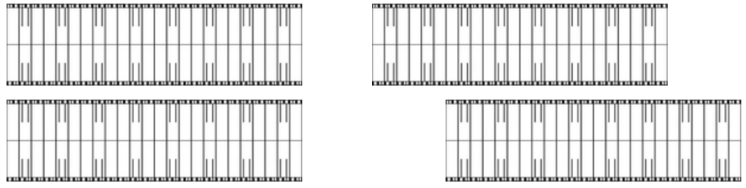
STEP #2: WALLS

Walls exceeding 3 meters in height must be reinforced with a double horizontal ring of No. 4 rebar, spaced 10 cm apart, in the 8th course. For walls longer than 7 meters, reinforcement must be added as specified by the structural calculations.

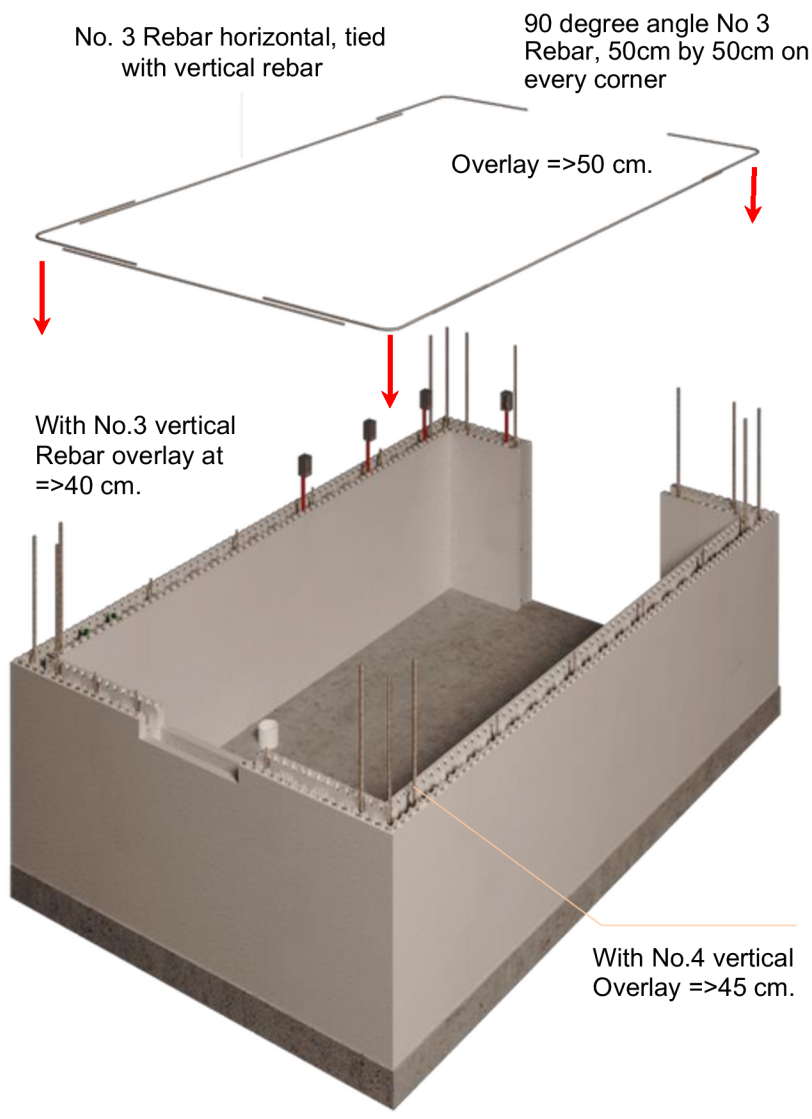
This is the most important part of the process:

You must continuously check with a level, string line, and plumb bob before and during the concrete pour to ensure the walls are properly aligned.
Continue stacking the next two or three courses of blocks as shown in the image. Repeat the installation of the horizontal ring, tying it to the vertical rebar. This system will create a cage, known as an integrated wall.
Every time you pour concrete, make sure to only fill up to the middle of the last course. Continue checking for plumb, level, and string lines.
It is very important that the wall is built using a running bond pattern (overlapped courses) for a better bond, all the way up to the desired height.



NOT CORRECT CORRECT

Conforme continúe avanzando vera la necesidad de colocar cimbra para puertas y ventanas.



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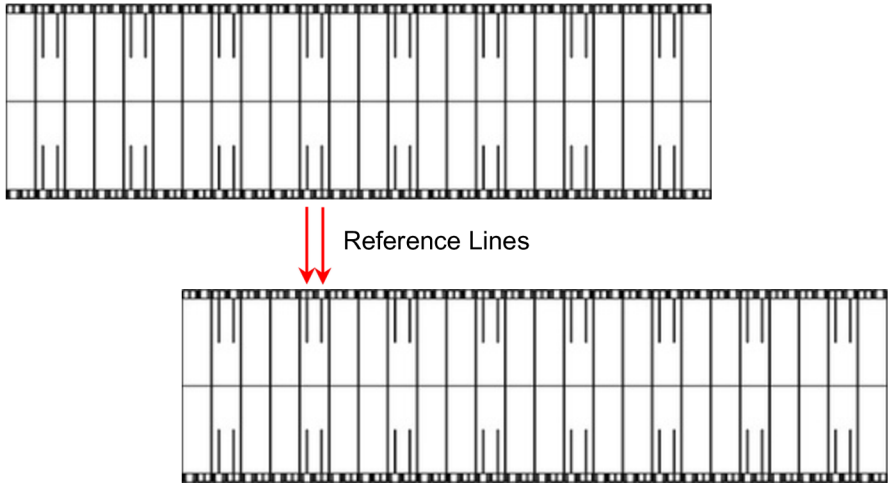
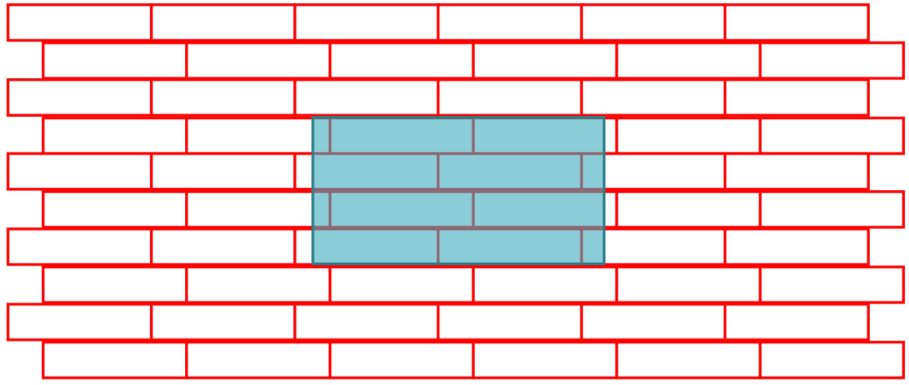
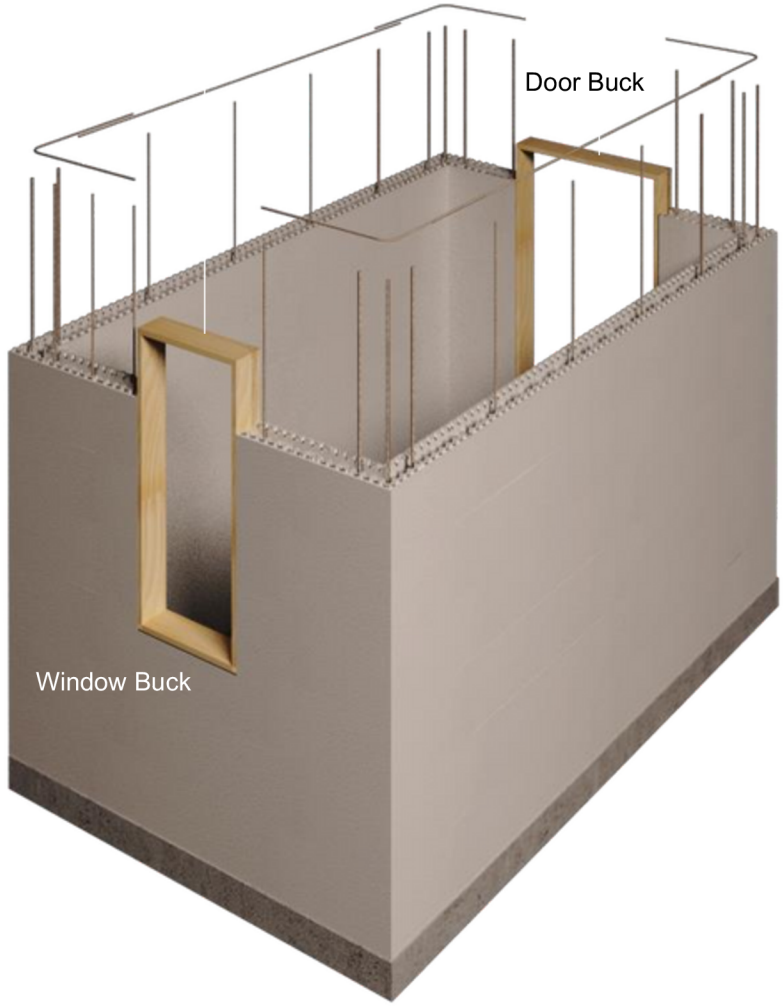
STEP #3: WALLS

The block has reference lines that help maintain continuity for the levels that will follow.



It's important to mark the distances and continue the reference lines so that when you reach the 8th course, you can assemble it correctly.





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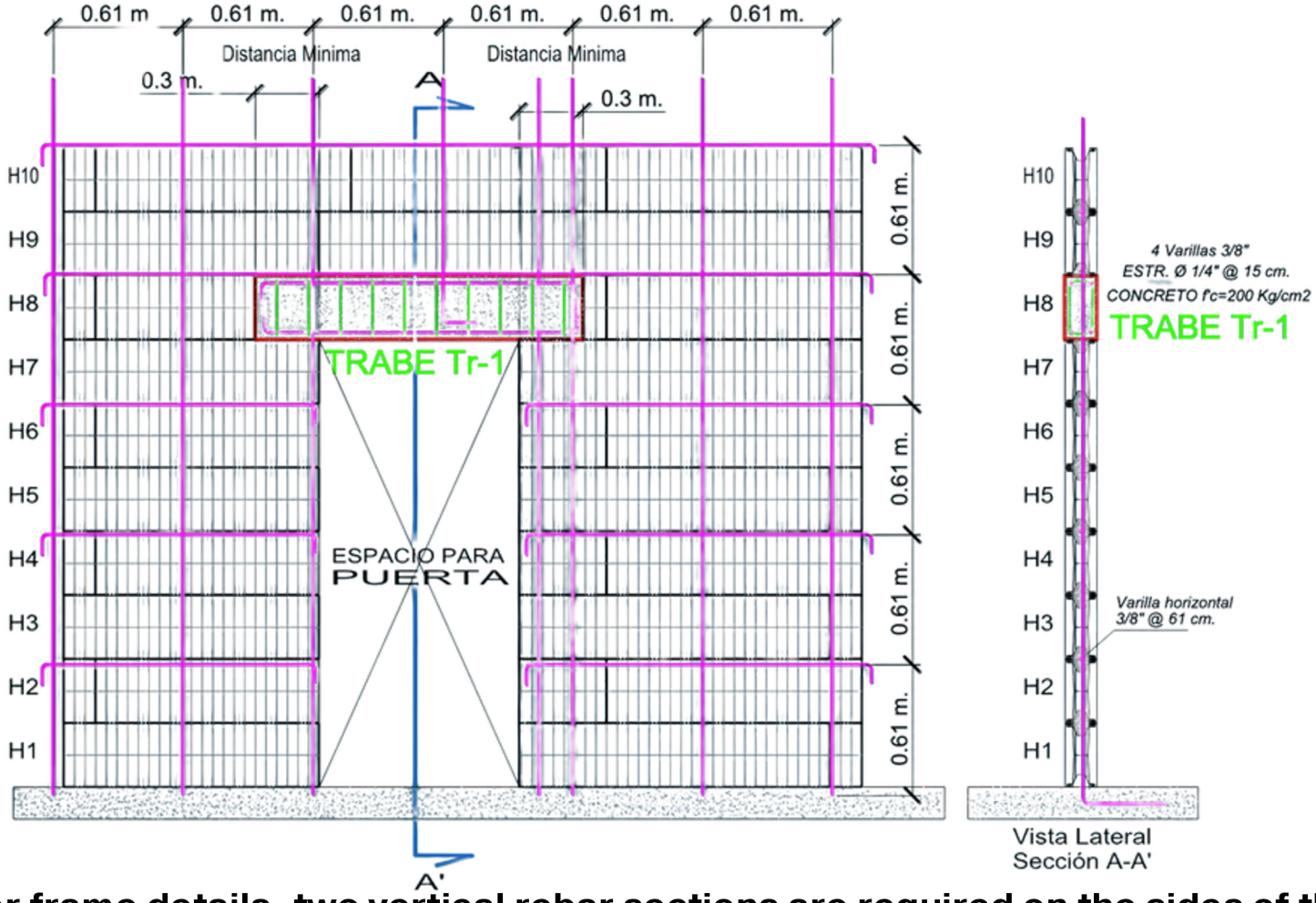
CONSTRUCTION DETAIL



For door frame details, two vertical rebar sections are required on the sides of the door opening. A lintel beam, with the same dimensions as the block, must be placed at the top to continue stacking the next courses.

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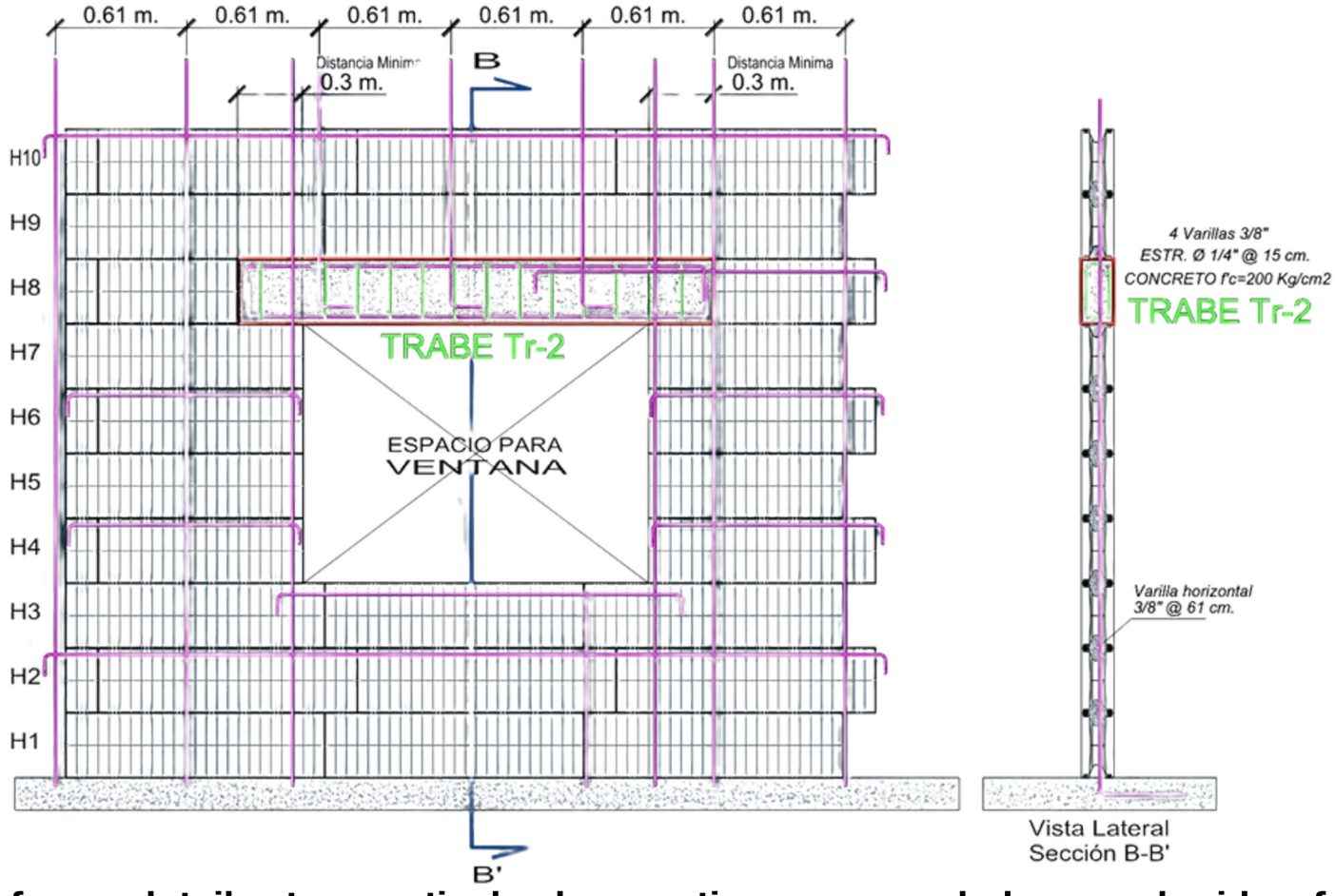
CONSTRUCTION DETAIL



For window frame details, two vertical rebar sections are needed on each side of the window opening. If a horizontal rebar is missing, be sure to add one. A lintel beam, with the same block dimensions, must be placed at the top to continue the following courses.

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STEP #3.1: WALLS

If you have a metallic bracing system, place them every 1.20 m to ensure alignment and to serve as scaffolding for the concrete supply. The first three courses of blocks should be poured in a spiral manner until the entire wall is complete, making sure there are no deformations or openings due to the concrete pressure.
It's recommended to always leave the last poured course filled only to the middle. This creates a cold joint in the center of the block, which will bond with the next pour. Try to gently vibrate all the cavities, especially if they contain utilities, to ensure the concrete flows correctly. If you have an existing structure, you can start the wall with a traditional-style concrete column.

Block Rupture During Pouring

This rarely happens, but a block can crack from excessive concrete pressure. This system has the advantage that if it does occur, the affected piece is compacted as best as possible and joined with wire. It's then supported by a piece of wood that will act as formwork, which is braced against the two continuous pieces.
When placing hidden or internal beams in slabs, it's recommended to leave two block pieces without concrete to be poured together with the installed beam. It's also recommended to leave rebar anchor lines to splice the beam. Continue with the steps until you reach the level of the second floor or the rooftop slab. You can allow the vertical rebar to continue up to the rooftop parapet.

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STEP #4: INTERMEDIATE OR ROOF SLAB

The process for installing a slab with a structural thermal Panels is similar to a traditional lightweight slab. It begins with installing the formwork, followed by placing the panels, modulating the pieces on the shorter span to cover 100% of the surface between the walls.

Next, special installations like electrical, next-level conduits, and anything else required are placed in the traditional manner, following the steps in the structural plan.

NOTE: The ICF-15 system supports any type of slab. Recommended ICF slabs for this system are shown at the end of this guide.

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STEP #4.1: INTERMEDIATE OR ROOF SLAB

For both second-story and rooftop slabs, continue with the vertical rebar to maintain the steel continuity of the walls. Use squares and reinforcements for the walls and shore up the slabs, anchoring them with vertical rebar. For a better anchor, it's recommended to use a horizontal rebar that ties the vertical wall rebar together, thus anchoring the slab's rebar cage. The vertical rebar that was left can help you continue for the second story or finish the parapet.

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STEP #5: FINISHES

Finishings and Accessories

1. For ceramic or stone finishes, they can be applied directly.
2. Fine basecoat, to be used for any type of paint or texture.
3. Interior plaster.
4. Drywall with its different finishes.

Additional Finishing Accessories

The ICF-15 construction system has no problem accommodating additional accessories or finishes, networks, security installations, etc. It adapts well due to its versatility.

Cleanup and Project Handover

It's worth noting that the ICF-15 construction system has many technical advantages, but in addition to all its virtues, it is also the cleanest, most organized, and most planned construction system.
Project progress can be better controlled visually and in terms of cost. Ultimately, the advantages and benefits of building with the ICF-15 system are greater than with traditional systems.

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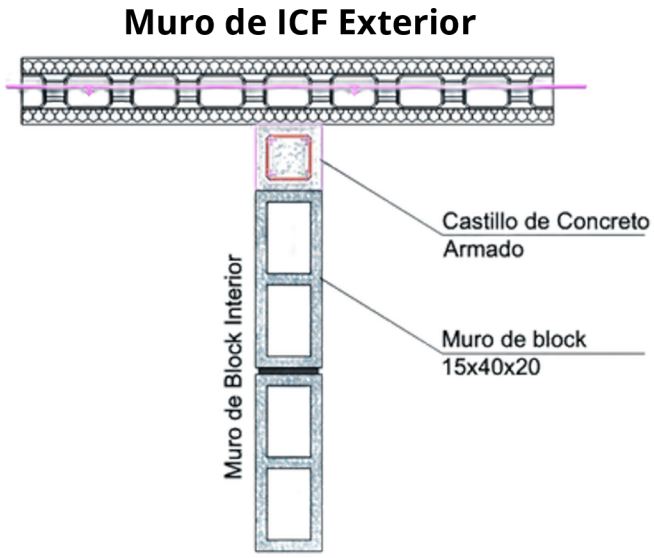
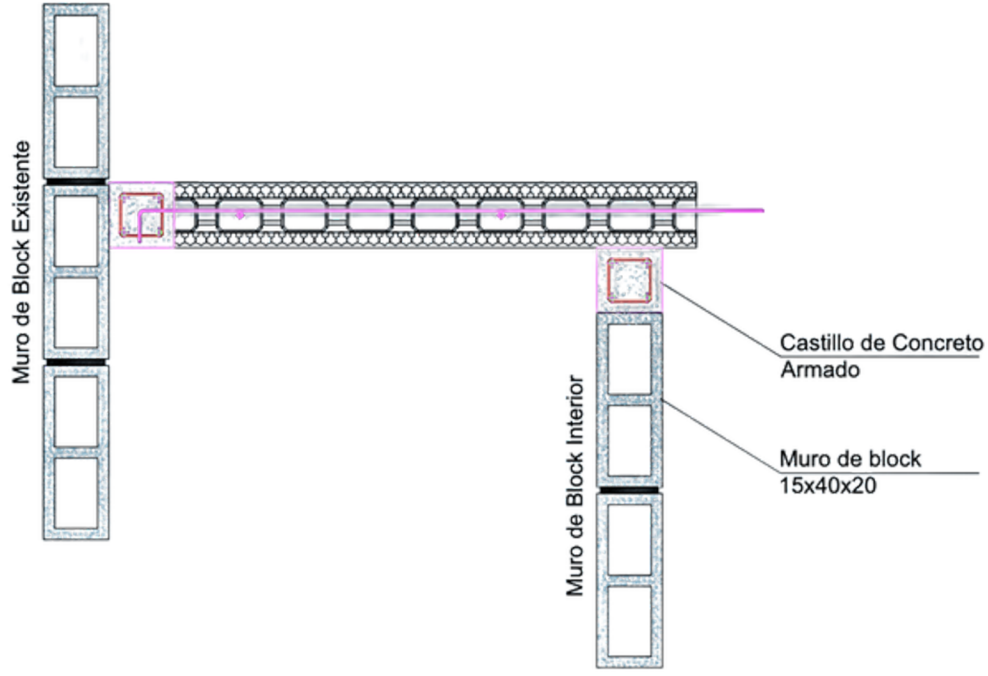
CONSTRUCTION DETAIL

Tying a traditional block interior wall to an ICF wall.



Detail for laying out traditional interior walls using a column to start the interior ICF wall.

Tying a traditional block interior wall to an ICF wall.



Detail for starting from an existing traditional block wall using a column to begin the tie-in to the ICF wall.

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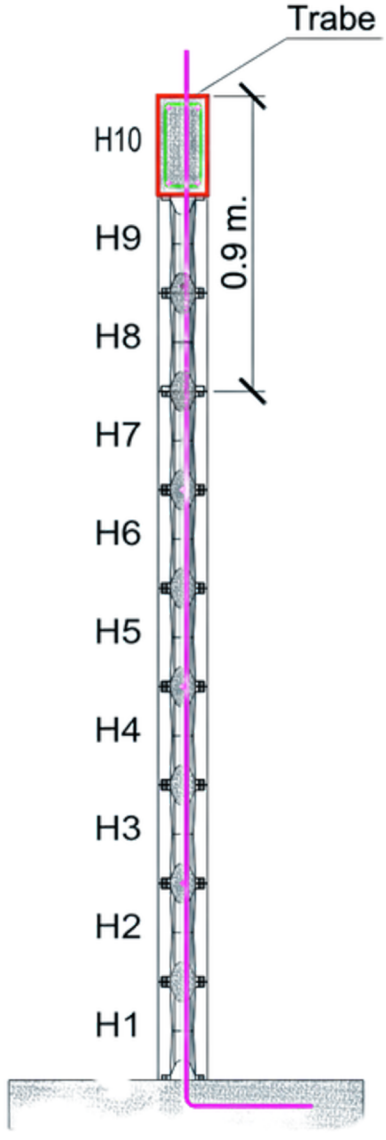
CONSTRUCTION DETAIL



When constructing a beam for a slab or for a door or window frame, use the same width as the ICF block. Build the formwork and place the rebar in a traditional manner, according to the structural calculations provided.

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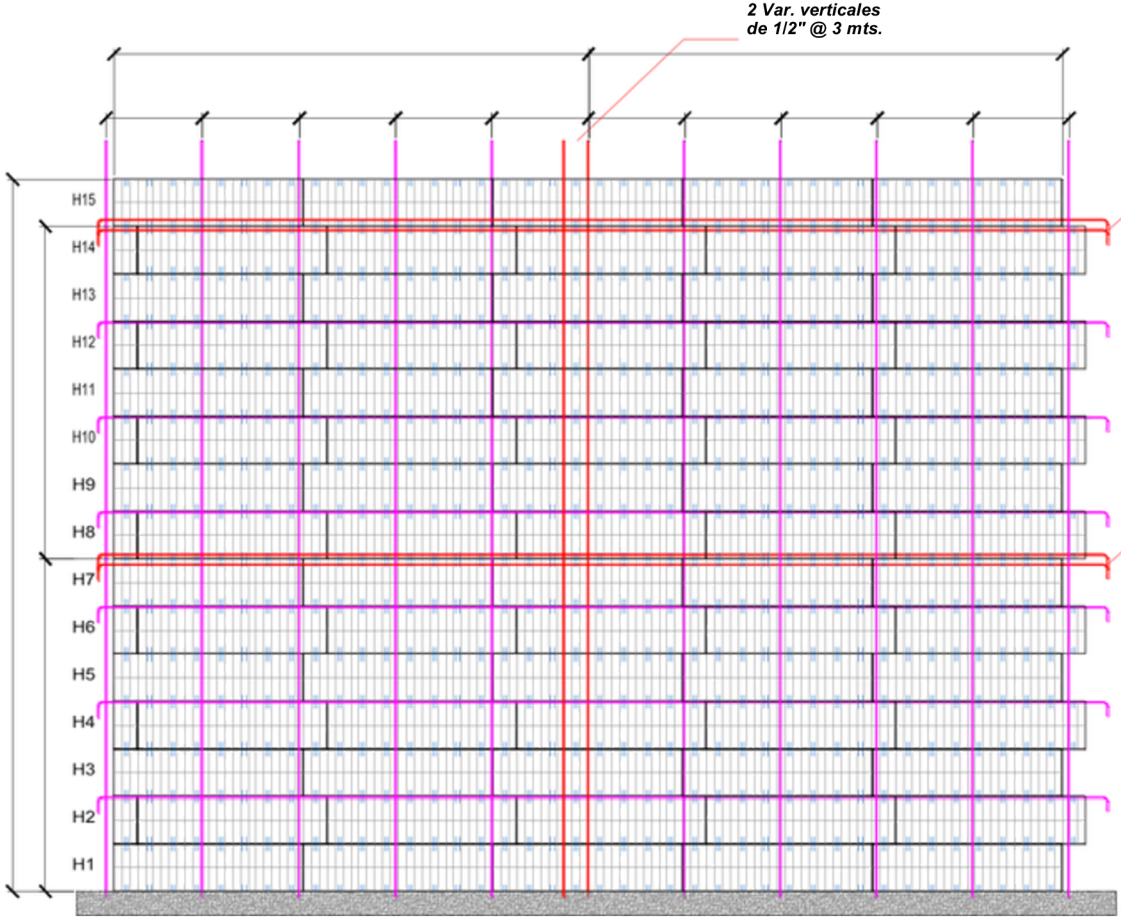
CONSTRUCTION DETAIL

The ICF-15 Block, in courses no greater than 10 and a maximum length of 3 meters, only requires 3/8" rebar in both directions every 61 cm.



When the height exceeds 10 courses, use two 1/2" rebar sections as shown in the image. These will act as a bond beam at a height of 2.10 m.

In a case where the wall exceeds 3 meters in length, place two 1/2" vertical rebar sections at a distance of approximately 3 meters. These will act as a reinforced column. See the image.

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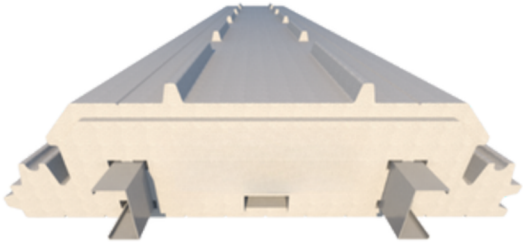
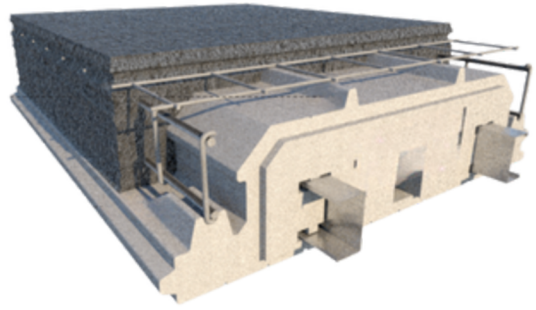
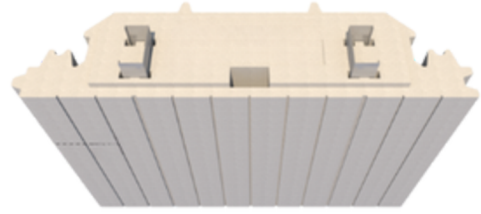
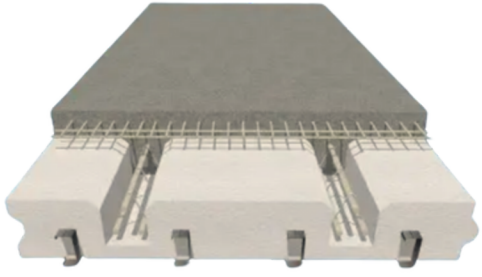
RECOMMENDED ICF ROOF SYSTEMS

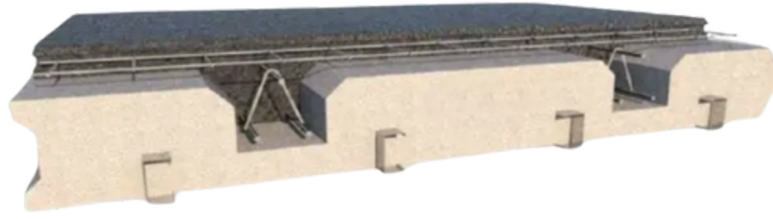






The ICF Slab System is an autoclave expanded polystyrene panel with galvanized steel supports, providing strength to receive the steel rebar and concrete during the pour.





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