

BRACING AND CORNER BRACING

9.1 Bracing Options

All insulating concrete form systems require bracing to achieve plumb, level walls. It is a critical step that should not be overlooked or taken too lightly. Bracing should be placed every 4 to 7 feet in a wall that has no openings and all corners should be braced each way. For walls with openings, place braces on each side of each opening (on the same side of the wall) to reduce movement.

There are two basic ways to brace your ICF walls: (1) improvised wood or metal bracing, and (2) professional bracing (also called “wall alignment”) systems.

Improvised Bracing

- ◆ **2x4 wood or metal bracing:** Fixed angular braces such as these do not allow for quick adjustments but can be re-used in the project elsewhere.
- ◆ **2x4 wood or metal with a turnbuckle installed in the down leg:** Closer to a professional set of ICF braces; you will appreciate the adjustment capabilities.

TIP: Screw improvised braces to in-ground stakes. Adjustments to wall can be made more easily than when nailing.

Professional Bracing Systems

There are many bracing systems made for ICFs. BuildBlock recommends four systems, which can be ordered through our MyBuildBlock Online Order System:

- ◆ Panel Jack by Reechcraft
- ◆ Plumwall
- ◆ Mono-Brace
- ◆ Superior Alignment Systems

All are metal or aluminum, C-channel systems with turnbuckles to adjust your walls. Most have the ability to place walk boards for top of wall access and others interact with scaffolding for taller ICF pours. Visit the BuildBlock website for brace details: http://www.buildblock.com/products/bracing/ICF_bracing.asp.

If you are an ICF professional, we highly recommend that you invest in the proper bracing to help make your pours a consistent success every time. These professional systems will help you install faster and achieve more professional results. Most quality professional crews use these systems.

9.2 Bracing Methods: Inside vs. Outside

Inside Bracing

When you brace inside the slab of a structure, you can use a 2x6 wood foot to attach your brace to. Use the foam adhesive to glue the wood to the slab and you will have a cleat to secure to.

If you plan to stain the concrete slab, you might want to brace to the *outside*, as the glue will show through the stain process. You can also drill into the slab using tap con screws. If using a wood floor, just screw to the floor decking.

(Note: Do not use screws if in-floor radiant heating is installed.)



Outside Bracing

Bracing to the outside allows the inside space free of obstruction and creates a good workspace. We have seen contractors without walk-board bracing wheel men on roll-around scaffold to place forms and concrete. This is more labor intensive but works well.

9.3 Bracing Techniques

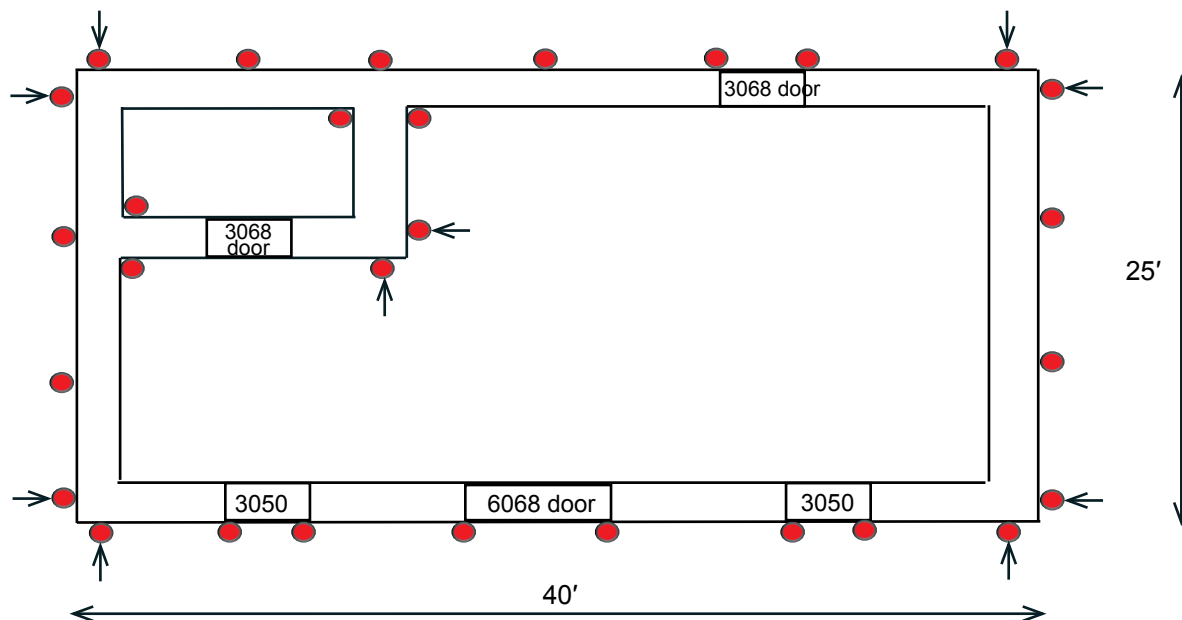
Once you have decided which bracing method (inside or outside) your job requires:

1. Place your braces vertically on the wall at the proper spacing and secure them to the ground so they won't pull the walls out of plumb!
2. Brace inside and outside corners and bring to plumb.
3. Brace areas of special need like windows, doors, bulkheads and short walls and areas you deem prone to any movement.
4. End walls should be braced on both sides and from top to bottom, on both sides, near the end.
5. Repeat the process until you have sufficiently placed all braces.
6. Attach the braces to the walls with strong course-threaded screws. (Attach screws to the BuildBlock hard points designed into every web and noted on the block face with the letters BB.)
7. You can also tie the block to the brace with tie wire every odd course for added strength by protruding the outer foam and around a tie, back through the foam and to the brace. This should not be needed except in extreme cases.
8. A string line should be placed at the top of all walls to keep your walls in check after your braces are set.

TIP: ICF walls have a tendency to settle slightly so some installers will lean their walls in ¼" off plumb to allow for this natural occurrence. If the walls are tilted in, it is much easier to adjust the walls out by gently pushing from the inside after the pour. This is only a suggestion. Other installers swear by staying plumb during the entire process. Also note another method is to make 1" slots in the brace stiff back to allow the screws to move down slightly if the wall compresses any. For this to work, screws must be slightly loose with a washer under the screw head. Professional braces are made this way to account for this tendency in all ICFs.

Bracing Diagram

Below is a simple diagram of an **outside bracing job site**. The red dots represent where you might place bracing in order to shore up everything.



(Note: We recommend using 5 ft. spacing if using walk boards.)

Below Grade Bracing

Bracing basement walls will nearly always employ inside bracing techniques. When excavating a basement, remember to give yourself an extra 3-4 ft. over-dig so you'll have plenty of room to work around the exterior and to place bracing for T-walls and such. Since basement walls are usually heavier, use a closer spacing of **4 to 6 feet apart**.

Note: Excavated basement walls should taper slightly so they don't cave in. Use caution not to become trapped while constructing basements. The soil at your job site will determine how much to over-dig the basement excavation.

1. Place your braces on the wall vertically and secure to the footing, slab, or un-poured excavated ground.
2. Brace inside and outside corners and bring to plumb.
3. Brace areas of special need like openings, bulkheads, short walls and areas you deem prone to any movement.
4. End walls should be braced on both sides and from top to bottom, on both sides, near the end.
5. Repeat the process until you have sufficiently placed all braces.
6. Attach the braces to the walls with strong course-threaded screws (if possible, into the BuildBlock hard points for stronger pull-out strength).
7. A top string line should be placed to keep your walls in check after your braces are set.

9.4 Bracing and Corner Bracing Examples

Minimal Outer Bracing



More Secure Outer Bracing



Minimal Inner Bracing



More Secure Inner Bracing w/ Walk Board



Ample Outer Bracing with "Scabs" on Non-Factory or Irregular Cut Joints (No Walk Boards)



9.5 About Blowouts

“Blowout” is the word used to describe a failure in a part of the walls capability to hold concrete. However, we hear more words like #&&!*%! or other non-printable expletives when one of these events occur. BuildBlock forms are so strong, it will be rare to experience a blowout caused by form failure. More often it will be caused by an oversight in construction or mud which is too wet with water (high slump concrete mixture). Sometimes webs can be broken in shipping. If a bundle of forms appears damaged, look for web damage before installing blocks. The main thing to note is that a blowout only effects a small portion of a wall. If you have one, here’s how to handle it:

1. Continue your wall pour in another area so you don’t loose any time.
2. Use a coping saw to cut out a clean opening where the damage is located and save the foam piece.
3. Use your hands to remove the excess concrete in the blowout area. Use gloves to protect your hands. Concrete burns are very dangerous.
4. Clean up the removed foam piece and the area around the blowout.
5. Glue the edges of the foam piece and replace it back into the hole.
6. Take a piece of plywood which is 12” longer on each side of the affected area and screw it into the ties on both sides of the opening.
7. Brace adequately across the patch.
8. Pay special attention to the opposite side of the wall where the blowout occurred. You might brace that area as well, if it looks as though the foam has been “stretched” or stressed. You can tell by looking at the composition of the beads. If they have separated, they are compromised and need a patch as well.
9. When re-pouring near the patch, once the area has been refilled, allow it to set a while before topping that part of the wall further.
10. Remove the patch when you take your braces down. The only damage left will be some concrete stains on the wall foam. This cosmetic only.



This blowout occurred when an installer (name withheld) dropped his tool in the void during construction of the wall. He cut a hole in the base of the foam and retrieved his tool, then glued the foam piece back and walked away! Had he braced this area with a scab or 2x4 across, we would not have this lovely story to tell!