

10.2 About Concrete Mixes

BuildBlock recommends the use of a 3/8" chip or rock mix 3000 PSI or stronger concrete mix for your walls. Your ready-mix plant will most likely have a mix design for a 3/8" chip mix and will refer to it as a pump mix. There are several alterations you can make to the recipe of concrete to combat weather occurrences, such as fly ash and air entrainment. But do avoid adding calcium to your mixes as it has a negative impact on the rebar reinforcement. If pouring in cold weather, have hot water added to formulate the mix.

Below is an example of a typical 3000 PSI - 3/8" chip mix design:

	With Fly Ash	Without Fly Ash
1. Cement Content.....	5.5 bags (517lbs.)	6.5 bags(611 lbs.)
2. Fly Ash* (Class C).....	1.5 bags (141lbs.)	0
3. Coarse Aggregate**: ASTM C-33 #8	1270 lbs.....	1270 lbs.
100% passing the 1/2" screen		
85-100% passing the 3/8" screen		
4. Fine Aggregate: ASTM C-33	1620 lbs.....	1620 lbs.
(Sand - FM*** 3.70)		
5. Water to make a 5" to 6"	40-46 gallons.....	40-46 gallons
6. Entrained Air****(for workability): 4% to 6% or 1 oz. per bag cement/fly ash		
7. Water Reducer: Encouraged		
8. Slump = 5 1/2" to 6" out of the pump		
(Proper slump is very important. Do not use less than 5" slump concrete out of the pump hose. Voids could be an issue.) Note: We always measure the concrete slump before it ever goes into the pump. A 1/2" extra slump will be absorbed by the aggregate during the pumping process so wetting the concrete to a 6" slump will usually give you a 5 1/2" slump concrete at the hose end.		

Depending on the type of material and individual gradation, these ratios may have to be adjusted. Consult with your local ready-mix supplier. The pump may be the controlling factor (for example, new pump vs. old pump, boom pump vs. trailer pump, etc.).

You may want to make some test cylinders as the concrete comes out of the pump. Take a 5-gallon sample and make five 4" diameter by 8" high cylinders for testing. Your mix design should yield 3000 PSI at a **designed slump of 5 1/2" to 6"** to pour properly. If not conveyed properly to your concrete company, they may bring out a 3000 PSI mix with a 4" slump design. If you wet it to pour, your concrete **will not** be 3000 PSI strength. Note: Most common mixes are designed to be wetted to a 6" slump maximum to obtain the mix designed strength. If you have any concerns, just order a stronger mix design (ex: 3500 psi).

Notes

*The use of Fly Ash improves the flow ability of the concrete and reduces the amount of Portland cement required. This saves you money and results in a concrete mix which is more "green" in terms of LEED points.

The **maximum aggregate size for 6" block is 1/2" (3/8" is recommended). The **maximum** aggregated size for 8" block is 1/2" (3/8" is recommended.) The larger the aggregate, the more problems you will have with concrete flow.

***FM = Fineness Modulus for sand.

****6% Entrained Air results in better flowing concrete.

For information about recommended concrete pouring temperatures, see Section 1.3 in this manual.

10.3 About Concrete Delivery Systems

There are a few options for placing concrete in BuildBlock forms.

- ◆ **Boom Pumps**
Boom pumps work the best because they have full job site access from one place, there is no “hose factor,” and it can move a tremendous volume quickly.
- ◆ **Trailer Pumps**
Typically used for smaller applications, trailer pumps are sometimes used for big jobs. The down side is hose management (heavy hose across ICF walls) and pumping lesser concrete volumes which results in a slower, longer pour time.
- ◆ **Truck Chute (Not recommended)**
Right off the truck chute is done sometimes when the conditions are perfect (like a basement with minimal over dig) and where you are confident you can direct the chute around the job site. However, chute filling can be messy and wasteful and you are more tempted to water down your mix which will decrease its strength.
- ◆ **Bucket System (Not recommended)**
A bucket system with attached funnel whereby a large container of concrete is hoisted around the site via fork lift or other means requires more labor and time.
- ◆ **Conveyor Delivery (Not recommended)**
Conveyor delivery is another possibility but only if you have a trunk hose to direct concrete into the wall cavities. Check with local suppliers.

Note: Trying to save money by settling for a less efficient concrete delivery system will cost you extra time and labor and will result in a messy job site and probably wasted concrete that will require later clean up.

The Importance of a Reducer System

When you order your pump truck, make sure it has a **reducer system** to help with rate of delivery. Most trucks come with a big 5” hose and you need more flexibility on the 5” wall than that alone can provide. Most companies now have a **flexible end hose attachment** in their system that you can close off with your hands after your pumper stops the machine. Others may have hoses that seal off when the pump stops pumping. This will save you from concrete spills time and time again. Check on these things when you order your pump truck.



10.4 Placing Concrete

- ◆ Concrete is heavy and *falling* concrete, well, it can exert some *real force* into the void when pouring. BuildBlock recommends you pour your projects in lifts of 3 to 4 feet high in the void around the perimeter of your project.
- ◆ If your mix is correct, you can approach the underside of your windows from either side to create a “flow” under the opening and get most of the void under the opening full. You can come back when you top off the wall (usually a slightly wetter mix) and top off through the holes on the bottoms of the windows.
- ◆ Begin pumping the walls **away** from a corner. Let the concrete “bounce” off the inner foam and ties to help diffuse the impact as it travels to the bottom of the form. As you fill the forms have a man lightly begin tamping them using an external vibrator such as the **Arkie Wall Banger**. This will help consolidate the base of the wall.
- ◆ You will begin to notice that you can create an arch or “flow” of concrete that will start a move downward as you have built up a mass in an area of the void. That is a great technique that you should try to employ as you fill around the project. This way the concrete flows ahead of you and does not fall as far, resulting in less vibration on the wall.

Consolidating Concrete

- ◆ Using a $\frac{3}{4}$ ” (maximum 1”) pencil vibrator in the top two-thirds of your walls to consolidate the concrete is **highly recommended**. Do a quick insert, then remove the vibrator at a withdrawal rate of approximately 3 to 5 inches per second in a pattern of every other cell. It is best to have a man follow the pumper with this method as you go around the perimeter.
- ◆ Take care around doors and windows; be diligent in these areas with consolidation as they are the “busiest” in terms of rebar and ties.
- ◆ Avoid vibrating the vertical rebar, as it could make the aggregate separate from the concrete itself in the lower parts of the wall. The lower parts should have been consolidated by the tamping done during your first lifts.
- ◆ If you need to stop the pour before you have reached the top, try to do so in the middle of a form so no cold joints and block joints meet.

Topping Off Your Project

To get a nice smooth finish and avoid being rushed by hot concrete, toss a bag of **FritzPak FR1** into the concrete truck when you are near the last half of the last block. FR1 is a dry powder additive that increases workability of concrete without water so you don't weaken your mix. Check out FR1 at www.fritzpak.com.

- ◆ As soon as you top off the walls, smooth the top with a trowel and you will have a nice, level top for your framers to set the top plate.
- ◆ Start setting your anchor bolts as soon as you finish troweling your wall tops. They should be marked and ready for insertion. (In the photo on the right, anchor bolts were placed in the center of the wall.) Note the off-sets on the corner bolts. The top plate ends need anchors near each end. At the corners, two top plates will join requiring the proper placement of two bolts. They will not be symmetrically placed. Otherwise, you will not be able to hold the ends of each top plate down properly.

WHAT TO SEE:

Anchor bolts evenly spaced both in height and width. Two bolts placed in each corner. Smooth concrete finish.

