

Slump Block Manufacture on a Columbia Machine

Mix Design:

Aggregate: Normal heavy weight block design mix. A round smooth aggregate works better than shapely broken aggregate. Pea gravel works great for slump. If a more open texture is wanted use 10% of 3/8 minus cinders in the mix.

Cement: 12% – 14% by weight of aggregate i.e. 4000 lbs of aggregate 480 – 560 lbs of cement

Water: 12% - 15% Water by weight of until mix slumps

i.e. 4000 lbs of aggregate 480 – 600 lbs of water (60 – 75 gallons)

Note: Final water should be put in slowly for best results, don't flood mixer (30 – 35 PSI water pressure)

AdMix: The most critical ingredient in slump block mix design

Most producers have best results with a Krete product called Maxi-Slump

Using 5 – 7 oz per 100 lb cement

Krete Industries, Inc. <http://krete.com/concrete-block>

Maxi-Slump a water-based concrete admixture designed to offer plasticizing action and to allow increased water use in slump block products. Providing superior lubricity, Krete Maxi-Slump outperforms traditional plasticizers while helping to disperse aggregates and integral pigments for brighter more uniform colors. This results in improved block aesthetics and trouble-free production.

Or BASF Product - MB-VR (7 oz per 100 lb. Cement)

http://www.basf-admixtures.com/en/products/airetraining/mbvr_standard/Pages/default.aspx

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Several slump producers use the following aggregate proportions:

Size	Upper	Lower
3/8	2%	0%
4	10%	4%
8	19%	13%
16	25%	19%
30	23%	16%
50	17%	10%
100	12%	6%
Pan	14%	9%

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Moisture Control:

- 1) Use standard resistive moisture probe and add final water via a water meter
This method is least desirable and results may vary. One customer reports that he manually adds the final water until the mixed material rolls over the mixer blades. Once the final water is achieved the mix is dumped to prevent over mixing. A small amount of water will make a big difference to the slump products.
- 2) Use a Microwave Moisture probe and put in final water via a water meter
This method works OK, vary the probe setting not the water meter amount
- 3) Use the Mix-Mizer Load Sense Moisture control
This method gives best more consistent results sensing the power load on the mixer motor to determine mix slump. This motor load sense system can be added to existing mixer controls.

Mixer:

Mix as usual but with higher moisture content and slump admix. If aggregate is very dry consider wetting it before putting it into the mixer for a faster mix cycle. The absolute minimum mixing time is a full five minutes in a ribbon blade mixer. All of the aggregates and cement must be thoroughly saturated to keep the mixed materials moisture consistent during the time the batch is being made into Slump Block.

Don't over mix the mix, slow the time between mixes or reduce the batch size to have fresh mix each cycle. Smaller batch sizes can prove to be very helpful with better mixing and fresher mix delivered to the machine.

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Machine Set Up:

Set up pallet table as standard with standard air settings

Set up shoes to just come to bottom of mold at strip. Don't put pressure on the mix, just bring it to size

Put the machine in Slump configuration so it strips on time and not via the height stops

The height stops should touch just at time of strip (touch and go) to maintain consistent pre slump heights. The height stops can be used to balance the fill. Raising to reduce fill and lowering to increase fill.

The mold end liners and partition plates can be modified to 1/8" above the desired pre slump height when possible to gain better control of the fill. This helps prevent bulging at strip.

When producing Slump Block, the fill vibration of the machine is all that is required there is no compression cycle for Slump. It is critical that when the compression head is down to the height stops, that the mold shoes do not go into the mold cavity. In this position, the bottom of the shoes should be flush or 1/32" above the mold cavity (end liners). If the shoes enter the mold at all before strip, it will cause the block to bulge around the bottom of the block when it strips out of the mold. The only purpose of the shoes is to follow the slump block out of the mold to help hold it together during strip.

Strike off bar height that works best for most producers is 5/16" above the mold (end liners). Using two pieces of 2" long x 5/16" square key stock under each end of the strike off works well to obtain this measurement quickly and easily. After the strike off plant is tightened remove the two pieces of key stock.

Feed drawer dwell time should be about 1.5 sec or enough time to assure even mold fill.

It works best to slow the Feed Drawer Back speed to prevent the mixed material left in the Feed Drawer from ripping material out of the front of the mold. This also allows the material in the mold to "sweat" to a tight finish/texture and promotes more consistent color tinting – cycle to cycle. The Feed Drawer back portion of the cycle should be approximately 1.5 sec. Even with the feed drawer back dramatically slowed down, the overall machine cycle time remains fast due to no Compression or Release time during the cycle.

Some producers like to use a strike off bar that is rounder or shaped to trowel the material into the mold. A back angle or round pipe works well on the bottom of the strike off plant.

Decrease the Release time to lowest possible. i.e. .01 sec.

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Mix fills easily due to moisture and admix. This may cause more mix to fill the back than the front of the mold. Therefore delay the vibrator fill vibration and slow the vibrator to 1800 – 2200 RPM. A higher vibration speed actually detours the mixed material from flowing evenly into the mold and causes a slight segregation of the water from the mixed material.

If the machine being used is an older model with a clutch/brake with non-variable vibrator drive speed, then a change in the drive sheave may be necessary. Replace the stock vibrator motor sheave with one that is the same size as the sheave on the vibrator. This produces a vibrator speed of approximately 1,725 RPM. You may need to elongate the rear of the adjustment slots in the motor mounting plate to allow the motor to be adjusted further away from the vibrators to properly adjust the belt tension. The smaller sheave also works very well when producing low height products such as pavers, slabs, or retaining wall caps.

Delay the agitator start until the Feed Drawer is nearly forward. Some producers add fingers to the agitator front that stick forward at 15 – 20 deg in addition to the fingers that hang down. Some use a $\frac{3}{4}$ " x $\frac{1}{4}$ " flat bar for these fingers to help fill the mold front.

Some producers may add a short feed drawer oscillation to help fill the mold front and/or create a break plant between the material in the feed drawer and that in the mold.

Slumper:

Don't try to over slump the product. For example on a 6" high product out of the machine the final slumped height would be 5-11/16" - 5- 5/8" (Slump between 5/16" ;and 3/8")

Thumber:

If the products stick to the steel production pallet a thumper may be needed to help free the product from the pallet before the push-off.

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