



MIXING POURABLE CONCRETE



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CONCRETE FROM CEMENT

Cement is a completely different substance from plaster. Although it is similar in appearance, the working qualities and the strength of the finished pour are extremely different.

Cement is made from a mixture of limestone and shale and gypsum rock that is crushed to a powder, blended in proportion, and baked in a kiln. With the addition of water, a chemical reaction begins to occur that results in the hardened product produced in a mold. Cement does not dry, but draws the water into itself through a chemical reaction.

Cement that has become damp, and been dried out, cannot be used. It becomes hopelessly brittle; the chemical reaction cannot be completed with an insufficient amount of water and further additions of water will not begin the reaction again.

Keep cement dry until it is used.

Cement itself is a binder that combines the aggregates added into it. Without stone and/or sand, the cement has no strength. Enough cement should be used in a mixture so that all the aggregate particles are covered, but too much cement in a mixture will, essentially, weaken it.

Until a producer has enough experience with cement, it is best to buy the premixed Portland Cement, which is commercially available.

The ratio of water to the concrete mix is extremely important.



Average compressive strength of concrete in pounds per square inch:

water [gallons] [with 94 lbs cement]	7 days	14 days	28 days	1 year
5	3500	4200	5000	7800
6	2400	3200	5300	6200
7	1700	2200	2900	5000
8	1100	1600	2000	4000



In order for the concrete mixture to be fluid enough to fill detail in the mold, more water than necessary for the chemical reaction is usually used.

Tamping the poured cement helps to remove this water. A stiffer mixture of concrete, with less water, will set up more quickly but will not be able to fill detail as completely. Very fluid concrete, with a lot of excessive water, will be weak and crumbly.

Also, concrete takes several days to begin fully hardening. In fact, concrete will continue to harden for several years. Concrete, when it is fresh, is at its weakest. The longer the concrete remains moist, the stronger it can become. Fresh poured concrete should be kept from the sun and covered so that the water forms a chemical reaction rather than merely evaporating. Poured concrete should be kept moist for at least three days.

The most commonly used cement is Portland Cement Type I. A large multitude of other cements are available but in ornamental casting they need not be considered. Different cements are trade-offs. Some may set more quickly but require stiffer mixes; others are harder but more expensive. Many have been developed for use in extreme climates.



Sculpture by Leslie Fry
Sarasota, FL



Gargoyle by My Place Molds & Manufacturing
Hopewell, OH

The basic ratio used with cement to make concrete is: 1 cement: 2 sand: 3 stone.

This ratio is a guideline. Temperature while casting, quantity of water, and character of sand and stone will all affect the final casting.

Altering the mix provides a means of using less water, or making a less weighty mix, or creating a different appearance. Aggregates can be made from almost any rock. Sand can be different colors.

Like finding the perfect mix of stone, sand, and cement for your purposes, developing techniques of coloring the cast concrete can result from experimentation.



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THE BASICS OF ANTIQUING

Antique finishes on ornamental concrete create fantastic results. The final product will then have real eye-catching detail. This type of product enhancement is simple and inexpensive in terms of material and labor. It will generate 25% to 100% or more in extra profit versus unpainted gray concrete.

Step 1. After demolding your ornamental piece, let it cure for three to five days.

Step 2. Using white latex house paint, preferably applied with a spray gun, paint the item completely with the exception of the bottom or ground side. Always leave the bottom unpainted or unsealed. Let this dry from 4 to 12 hours minimum.

Step 3. Spray the item next with black latex stain. Make the application light but cover the piece completely. Proceed with step 4 without delay.

Step 4. Have a bucket of clear tepid water and several clean rags ready. A sponge is also useful. Using damp rags and rinsing them frequently, proceed to wipe the still fresh black stain from the piece. The more you wipe off, the more white is exposed. The black will stay in the finer detail and create the antiqued effect. Let the piece dry for 24 hours.

Step 5. For products used in exterior locations, a final high quality clear coat sealer should be applied.

Step 6. Admire your work. Mark up the price and SELL, SELL, SELL.

INSTRUCTION NOTE. The white base coat and black stain coat may be substituted with colors of your own choice for special effects. Try a variety of combinations. You will be amazed with the results.

Dry brushing a highlight color such as gold over the dried stain coat will often add a touch of class to your products. In many cases it will give your concrete a metallic look.



BASICS OF PIGMENTING

Pigmenting or adding color to your concrete during the mixing process is another popular method of color change from the standard gray.

Pigments are available in a wide variety of colors and may be increased or decreased within the mix to change to a wide array of tones within each color. Never use more than 10% pigment in a concrete mix. It can affect your setup.

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HOW TO POUR CONCRETE

Pouring concrete into a mold must be done carefully so as to create as few air bubbles or air pockets as possible. One of the greatest enemies of ornamental concrete are bug holes. Bug holes are caused by air bubbles being trapped in the mix and not being able to escape, thus you end up with a hole in the finished product. To properly pour concrete



into your mold, start by pouring slowly into the center of the mold. Vibration is recommended while pouring. On taller molds such as pedestals and planters with cores it is best to pour about one third of the mold at a time with a few seconds of vibration between each pouring section. This allows the air to work its way to the top in sections rather than having to pass through 20 to 40 inches of concrete all at once. When the pour is complete, the concrete should have a creamy look to it around the edges of the mold.

THE PROCESS OF EXPOSED AGGREGATE CONCRETE

The exposed aggregate appearance of finished concrete products is attained through the use of a retarder. Retarders are available in either liquid form or as an impregnated paper product. The paper type retarder is generally used for the faces of stepping stones or bird bath tops. Simply cut or order to size and drop in the face of the mold prior to pouring. The liquid retarders are brushed on with a paint brush. This type of retarder is used on vertical side molds as in trash receptacles or bird bath pedestals. The chemical action of a retarder with cement causes the outer 1/16 inch to 1/8 inch of the concrete not to set up. When removed from the mold a hose or pressure washer is used on the finished concrete to wash away the unfinished cement. With the outer surface washed, the aggregate of the mix, preferably pea gravel, is exposed on the surface. This process not only creates some beautiful pieces but makes your mold work double duty. You can produce smooth or exposed from the same mold, giving you two pieces that look completely different. If you choose to use your molds for both, remember to thoroughly clean the mold after retarder is used to prevent spotted pieces from being produced.



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