

Casting with Plaster and Cement



Before mixing plaster or cement **make sure there are no holes or gaps** in your form-work/mould otherwise the mixture will leak out. Plug gaps with clay or cover them with tape - if in doubt please ask for advice!

Plaster

You must always **add the plaster to the water** not the other way around. Whatever the amount of water you add to the bucket expect that amount to double when you're finished adding plaster. So choose a container big enough for your mix.

Use a cup for scooping plaster, it makes adding plaster easier and decrease the chance that your going to contaminate your main batch of plaster. When adding the plaster into the water you should use a shifting motion being sure not to concentrate plaster in any particular area.

Stop adding plaster when islands of dry plaster start to appear at the surface and don't immediately absorb. Another indication that you have added enough plaster is when there is a fine layer of water sitting on top of the absorbed plaster. Let the plaster sit for 2-5 minutes before stirring, this wait time ensures the plaster has fully absorbed the water and makes the plaster harder.



Stirring by hand has the advantage of releasing air bubbles but careful mixing with something else can yield the same results. Stir till the mix becomes thick enough to create

lines (this sometimes sneaks up on you so be watchful). Pour your mix evenly and in a steady manner to not create air bubbles. After you fill your vessel be sure to shake the mould gently to release any bubbles that may form in the pouring process. Now wait till the plaster sets, also be careful, plaster gives off heat when its setting so wait till it cools down before doing anything with it.

Concrete

The basic idea is to mix sand (or sand and rougher aggregate) together with cement thoroughly, then add water and mix until all the dry mixture is wet and is fluid enough to pour into your form-work or mould.

1. Calculating how much dry mix in total is required

As a guide the dry mix (cement+sand/aggregate) needs to be twice as much in grams (g) as the cubic volume (cm³) of the mould you are filling. For example a mould of 500cm³ requires 1000g of dry mix.

2. Calculating ratios within the dry mix:

The cement/aggregate ratio needs to be determined first which makes up the dry mix. The usual range is somewhere between 1:1 and 1:6 and a popular ratio used is a 1:3 mix.

Examples for a 1000g/1kg mix of dry ingredients:

1:1 mix – 500g cement : 500g aggregate (Small scale)

1:3 mix – 250g cement : 750g aggregate

For small scale casts use builders sand and when casting larger things (bigger than 1kg) use sharp sand with rougher aggregate (like gravel) for strength

3. Water addition:

How much water to add to the dry mix is a function of the process – casting into a mould will need a wetter mix that slumps into place. As a guide the dry mix to water ratio should be 2:1 (e.g. 100g dry mix to 50g water).

More water can be added but be aware that the more water added at this point the weaker your concrete will be structurally.

Curing:

The term used when concrete is left to harden, is 'curing'. The concrete needs to be left for at least 24 hours to cure before it is removed from the mould.

Reinforcement:

Concrete is weak in tensions, e.g. across long spans like bridges where a load in the top of an unsupported section can cause tension on the underside. You can add wire/steel rod in a skeletal form to your mould or add fibreglass fibres to your liquid cement mix before you pour it.

NEVER POUR PLASTER OR CEMENT DOWN THE SINK! Pour remains from your mixing container in the bin and leave residue in the bowl to go hard. Please clean up tools and surface when finished!