

# Slip Casting Basics

Adapted by Creative Paradise Inc. from original guide created by [Ceramic Arts](#) of Burlington, Ontario, Canada

## What is Slip Casting?:

Slip casting is a method of creating ceramics that involves pouring liquid clay into a plaster mold to create a hollow final piece. Slip casting can be used to create a wide variety of ceramic pieces, both functional and decorative.

Slip casting works via the use of plaster in the mold. The plaster of the mold slowly pulls water out of the liquid slip mixture, leaving behind only the ceramic particles in a layer along the mold wall. Once that layer is thick enough it can be left to dry, then removed, cleaned, fired, and decorated as desired.

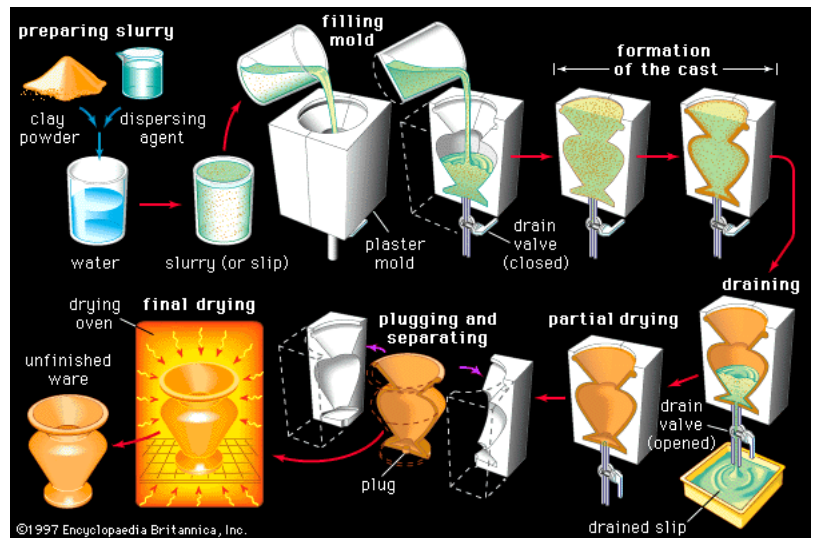


Image Credit: [Encyclopedia Britannica](#)

The general order of slip casting is:  
Pouring -> Draining -> Drying -> Demolding -> Cleaning -> Firing -> Decorating

### Common Terms:

- **Slip:** A liquid suspension of ceramic particles in water
- **Mold:** The block containing the shaped cavity used to form the slip into the desired shape. Typically made from plaster.
- **Greenware:** A dry, unfired ceramic piece composed of tightly packed ceramic particles

## Anatomy of a Mold:

Molds for slip casting have a few specific parts and terms particular to casting in this manner.

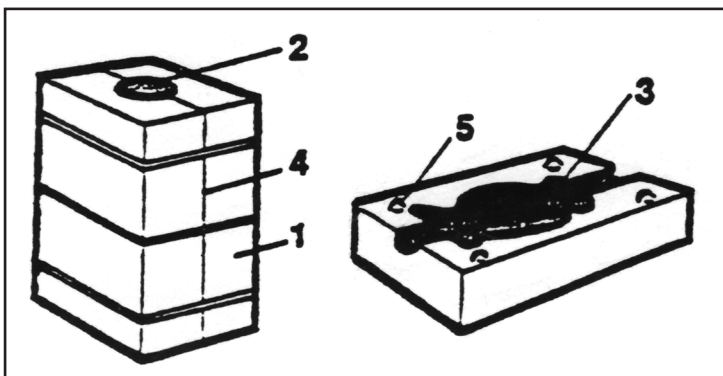


Image Credit: Ceramic Arts

1. **Mold Face:** The outside surface of the mold
2. **Pour Gate** (or Pour Hole/Pour Spout): The opening of the mold into which liquid slip is poured
3. **Mold Cavity:** The empty space inside the mold containing the “negative” impression of the object or design
4. **Seam:** Where the separate sections of the plaster mold meet
5. **Keys:** Alignment and locking devices. They are concave on one side and convex on the other, allowing the two halves of the mold to fit together and not slip when assembled.

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## Basic Equipment:

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- Desired Slip Casting Mold
- Liquid Slip
- Suitably Sized Vessel for Holding and Pouring Slip
- Mold Straps (for Large Molds)
- Rubber Bands (for Small Molds)
- Blade (for Removing Pour Spout and/or Adding On)

## How to Cast:

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1. Separate the mold and check it for dust or other foreign matter. Once clean, reassemble it, matching the mold keys together, and secure with a mold strap or rubber band depending on mold size.
2. Pour strained slip into the pour gate of the mold slowly and evenly, filling the mold to the top of the pour gate. Use a container that will hold more than enough slip to fill the mold completely, as having to switch containers midway can result in uneven drying.
3. The plaster mold will absorb the water in the slip, forming a clay shell along the inside mold cavity. Keep the mold pour gate full until the desired thickness is obtained. Cut a notch to determine the thickness of this shell, which should be around 1/4" thick.
4. Once your desired thickness is obtained, slowly drain any excess slip from the mold. Once the slip has drained completely, repeat **Steps 2 & 3** with any other pour holes on the mold.
5. Once the mold is completely drained, allow it to sit and set until the slip dries to leather-hard clay. The length of time needed for this varies (see "**Tips**" on **Page 3**).
6. When the clay is leather-hard, remove any excess from the outside of the mold and pour gate. Insert a trim knife or thin blade between the mold wall and clay, cutting any excess away from the mold and the casting.
7. Place the mold on its side, remove the bands carefully, and allow it to sit for a few more minutes.
8. To open the mold, lift the top half straight up. Do not move it side-to-side, as this can damage the cast piece inside. If the top doesn't release easily, let it sit a little while longer.
9. Don't fully remove the piece from the mold until it is dry enough to support its own weight. Handle the casting with care when you do remove it, as it will be soft and easily distorted. For large, flat pieces such as plates, loosen the casting a bit to allow the bottom half to dry for an additional 4-5 hours to prevent warping.
10. For small pieces, once the piece is loose tilt the mold gently forward and allow the casting to fall into your hand. If the piece requires attachments such as handles, do this shortly after the piece is de-molded.

## Casting a Multiple Piece Mold:

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To produce greenware in unusual shapes or with extensive detail, sometimes a mold will have more than two pieces. Many Christmas Tree molds (such as Creative Paradise/Kimple Mold's [1813 Plain Tree](#)) fall into this category, with each plaster mold often having three pieces.

All multiple piece molds are a bit different, so there are no hard and fast rules. In general, simply clean the mold and put it together as usual, making sure all keys are tightly matched, and band or strap in more than one direction to make sure each section of mold is secure.

Once the casting is set, trim away any excess clay unless otherwise indicated and remove the bands or straps. Lift off the last added section of mold first unless otherwise indicated and then proceed as normal.

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## Add-Ons:

The pieces or parts added to a base piece are known as “add-ons,” and should be poured at the same time as the main mold. Once all parts are released from the main mold, the add-ons can be placed.

### Placing Add-Ons:

1. Place a vent hole in the main piece if the add-on is hollow to allow any air to escape from the add-on.
2. Neatly remove any excess clay from all pieces with a sharp blade.
3. Slightly wet both pieces with water and a soft brush.
4. Add a thin layer of slip to both pieces where they will attach.
5. Secure the pieces together and hold in place until they bind (usually a few seconds).
6. Smooth out any excess slip around the joint with a soft brush, removing any drips.
7. If the add-on is heavy it may need a bit of additional support with foam or crumpled paper.

## Casting Tips:

- The time needed for the desired thickness of greenware depends on the following:
  - Dryness of the plaster mold. A damp mold will take longer to reach the desired thickness
  - Ambient heat and humidity in your location
  - Slip condition\* - thin slip takes longer to set up than thick slip
- A normal casting is about 1/8” – 1/4” thick when dry. Greenware can be a bit thicker but should never be thinner, as thinner castings break easier.
- If using reclaimed slip, do so according to manufacturer’s instructions. If done incorrectly, the resulting piece may be brittle or chalky, hard to release from the mold, or may cause crazing in any applied glazes.
- When slip hits the plaster mold directly it can create hard spots. To avoid hard spots:
  - Pour the slip in a circular motion
  - Pour over a palette knife or piece of wood
  - Pour against the side of the mold to break the fall of slip
  - Fill slowly to reduce the impact of slip on the bottom of the mold
- Allow greenware to dry naturally and slowly. Forced drying can cause a crust to form on the outside.
- Doing a test casting with a new mold can help you figure out how the mold pours and can also remove any leftover dust or particles that may remain in the mold cavity from production.
- Always trim the pour gate from the greenware when dry. Don’t tear it, as this can lead to cracking.
- Let two pieces that will fit together dry together (like a bowl and lid) to ensure a good fit.
- Keep your casting area and molds clean and clean any excess slip from the mold when not in use. Make sure your hands are free of grease and oil while casting.
- Avoid pinholes (tiny holes in the resulting piece), as if the greenware has pinholes the final piece will too. Pinholes can be caused by:
  - Slip that is too thick
  - Pouring into a mold that is too wet
  - Air trapped in the slip
  - Pouring too quickly
  - Pouring into a dusty mold

\*Two common slip problems to watch for are “soft cast” (slip taking too long to cast and wanting to stay soft, indicating deficiency of sodium silicate) and “short cast” (slip sets too quickly, is very smooth and cracks easily, indicating excess of sodium silicate)

# Common Casting Questions:

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- **What causes the fine ring lines on my greenware?**
  - The slip was poured too slowly. Speed up your pour.
  - The slip may be too heavy. Thin if necessary.
- **What causes a heavy/thick ring around my greenware?**

You may have stopped pouring for a second or two. Make sure to always pour continuously, and don't switch between vessels while pouring.
- **When I opened the mold my greenware had collapsed. What happened?**

A collapsed piece is caused by a vacuum during draining, as air couldn't enter the mold cavity. Possible causes may be:

  - The mold was drained too fast. If the pour hole is small, try draining more slowly. Or listen for a gurling sound while draining. If you hear one, slow your drain speed.
  - The slip may be too thick for proper draining.
- **What causes hard spots?**

Hard spots are the result of clay being packed too tightly against the mold by the force of pouring. To help avoid them, see the "**Tips**" section on **Page 3**.
- **Why have my flat items warped?**
  - The greenware dried too quickly. Slow it down by covering it with a plastic bag.
  - Your drying surface may be uneven- check to see if it's flat.
  - The piece may have dried unevenly. Make sure the piece is in a place where all parts can dry equally and evenly, not just the edges.
  - **Tip:** Adding a piece of sheet rock over a completely flat piece can help keep it flat.
- **Many of my molds have tiny pouring holes. Is there an easy way to pour these?**

For small pieces with tiny pouring holes, use thinner slip and don't cast as heavily. Particularly small pieces can often be poured solid, so drain only if necessary.
- **Will using air pressure to release the greenware help?**

Yes- air pressure lifts the piece away from the mold wall and is particularly helpful with flat or highly detailed pieces. Use air pressure only after the mold has been open for a period of time.
- **I don't have a way to use air pressure to help with release but my mold is sticking. What can I do?**
  - Let the greenware dry in the mold a bit longer.
  - Use a soft rubber mallet to gently hit the edge of the mold.
- Feel free to reach out to us at [creativeparadiseceramics.com](mailto:creativeparadiseceramics.com) with any other questions!

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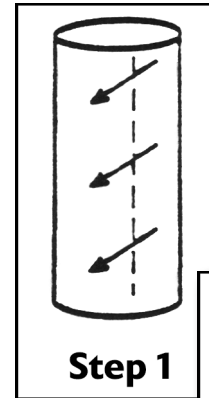
# Cleaning Greenware:

Once the greenware is cast it must be cleaned- if a crack or seam line is fired into the greenware it will always be visible. Select your greenware carefully, making sure it is well-shaped and free of stress cracks.

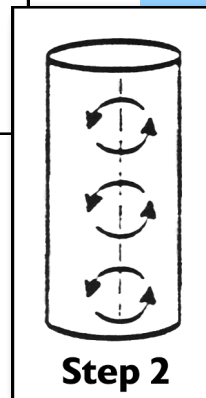
Select the appropriate tool for the greenware you're cleaning. Straight blades are best for rounded edges and flat edges like the sides of boxes. Rounded blades are good for fine details, tiny areas, and hard-to-reach grooves and crevices.

## Cleaning Guidelines:

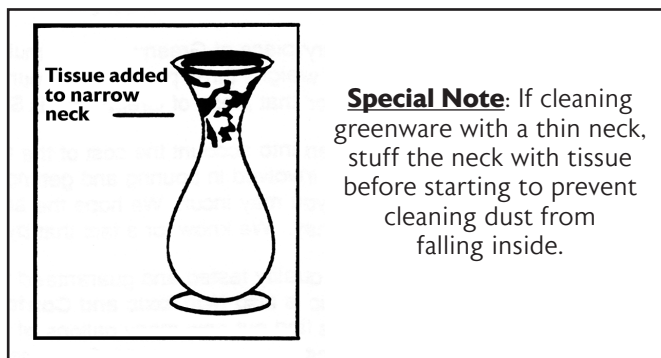
- **Step 1:** When using a straight blade, work on a diagonal across the seam line, not up and down or side to side.
- **Step 2:** Always pull the tool towards yourself.
- **Step 3:** Remove any seam lines completely. Check with your fingertips to make sure they're completely gone.
- **Step 4:** Sanding can be done when necessary with a rubber scrubber or grit cloth. Take care not to scratch the greenware or remove detail when sanding.
- **Step 5:** Dab with a damp (not wet) sponge after cleaning to remove dust, always working in a single direction.
- **Step 6:** Check the details and recarve if necessary with a sharp tool such as a stylus. Take care not to overwork the piece while cleaning.



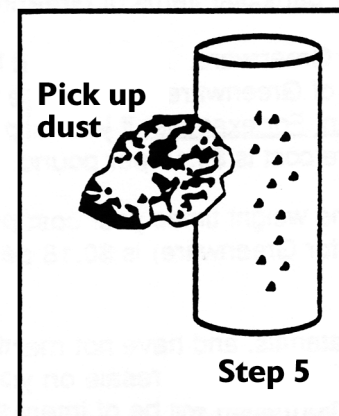
Step 1



Step 2



All Images on Page 5: Ceramic Arts



Step 5

## References and Further Reading:

The majority of this guide is based on an old pamphlet created by Ceramic Arts Canada in Burlington, Ontario. While this pamphlet does not seem to be readily available on their website as of right now (October 2024), their website, [ceramicarts.com](http://ceramicarts.com), does contain a wealth of other ceramic information.

The diagram on **Page 1** was sourced from Encyclopedia Britannica's article on Traditional Ceramics, [readable on their website here](#). In addition to slip casting, the article details numerous other forms of ceramic production as well as the general history of ceramics as both an art form and manufacturing process.

The definitions as well as a few other bits throughout this guide were adapted from an old teaching lab produced by The American Ceramic Society. The particular lab referenced for this tutorial can be found [at this link](#), but their basic website, [ceramics.org](http://ceramics.org), has a multitude of other educational resources.