

WARPING

Q: What are the known causes for warping?

A: In general, some of the known causes for warping are:

- 1) improper wedging
- 2) uneven moisture content
- 3) mishandling the clay during the wet work
- 4) over working the clay while throwing
- 5) uneven drying
- 6) speed drying
- 7) uneven firing
- 8) speed firing
- 9) using uneven or warped shelves for wet work, drying and firing

Q: What can we do to minimize or even eliminate warping?

A: Develop good work habits:

- 1) Proper wedging, proper wedging and proper wedging. Wedging is a determining factor that takes precedence. Wedging not only removes air bubbles but more importantly produces a consistency in the clay body. This eliminates the separation of soft and stiff areas in the clay.
- 2) Always begin any project with the awareness that "clay has memory." However you handle the clay during the wet work will be revealed during the drying and especially the firing.
- 3) Always roll slabs in both directions so that the clay molecules are not moving in only one direction.
- 4) When removing slabs from the slab roller, never pick up the slab by the two ends causing the middle to sag. Always place a bat or a board or anything flat and solid on the slab.



Roll (or fold) the canvas snugly over the edges of the board



Grip the edges of the board firmly and then flip it over



Remove canvas



This will keep the slab true and flat



- 5) Slow drying will always produce favorable results where as speed drying will not. This can be accomplished by using a damp closet, wrapping your work in plastic or both.
- 6) Never allow a fan to blow dry only one side of your work. This will cause uneven drying which leads to warping. If you're in an environment where you can't control the wind draft, then rotate your work frequently about every fifteen minutes.
- 7) Since the bottom always dries last, drying your piece upside down after trimming will allow the bottom to dry more evenly with the top. Drying your piece upside down on the rim also helps to prevent warping.



- 8) Clay shrinks as it dries. If you're drying your piece on a surface that doesn't allow it to move freely while it's shrinking, then warping and cracking will occur. Place sheets of newspaper under your clay work to prevent the clay from "binding" as it shrinks.
- 9) When firing, always place tiles, plates or anything with a wide base on shelves that are flat. If the tile is placed on a shelf that is warped, then the tile will warp during the firing. This occurs because as the clay gets soft from the temperature, it will take on the shape of the shelf.

10) Warping in the glaze firing could also be due to the length of time taken to throw the ware. When a pot is begun and finished in three or four pulls, the clay does not get as soft, and there is less chance of later warping due to stresses induced by uneven moisture content.

Q: Can you give us any tips on how we may avoid tiles warping?

A: Flat slabs have a tendency to warp as they dry. There are several things you can do to minimize or eliminate this:

- 1) Grooves may be cut into the back side of the slab. Notice how this is done on commercial tiles.
- 2) Dry the slabs slowly, preferably between flat plaster bats that will absorb moisture from the clay.
- 3) If you don't have access to plaster bats, turn over the clay slabs occasionally during the drying in order to help prevent warping. If the slabs are placed on layers of newspapers, the paper will absorb moisture from the clay.

Q: I have some difficulty with warping of my thin, flat tiles, especially when coats of underglaze are applied. Can you tell me why?

A: The wetting of only one side of the tile or plate can cause warpage by creating a strain in the piece as it dries. You might try brushing the back of the piece with clear water after you've applied underglazes to the front---but don't use too much water. An equal wetting of the piece should help hold down warpage.

Q: I have trouble firing wide, flaring bowl shapes in my electric kiln. This trouble is less pronounced in the bowls made with thick walls, but the very thin ones invariably warp. What causes this?

A: Thick has more structural integrity than thin. Thick is less likely to warp and is capable of taking more abuse, especially if it is a functional or utilitarian item. If you prefer thin, then it is best to place thin, low, wide bowls in the center of the kiln, away from the elements, and stack the outer edges of the shelf with vertical shapes. The thinner the wall of the piece, the more important it is that the bowl receive even heat during the firing. If you are firing directly on the shelf, make sure there are no rough spots that might prevent even shrinkage of the foot of the bowl as it fires.

Some potters spread a very thin coating of pure white sand, (or grog) on the shelf before firing delicate shapes, the grains of sand act like little roller bearings. Finally, fire more slowly during the early part of the firing with an extended pre-heat.