

## Cracking and Breaking in Making and Firing

Cracks are caused by excessive physical stress in a pot, there is always stress because of the initial shrinkage of the clay as it dries and expansion followed by contraction in the firing. The shape of the pot is all important in preventing cracking, uneven sections that are too thick or too thin, awkward angles and cut outs in the body or in the rim will all contribute to cracking. Clumsy handling of the greenware may alter the alignment of clay particles causing an in-built stress. Uneven drying will also cause stress to build up. It would require many pages to cover all the causes of cracking but here is a selection of most common problems.

### Cracks in Greenware.

Cracks can occur in unfired pots as they dry, sometimes the cause is drying unevenly for example, if a pot is left to dry on a non-porous surface then the top half may dry and contract while the base is still wet and therefore bigger. Generally, it helps to dry pots slowly but it is possible to dry them fast if they can be dried evenly. Leaving just-thrown pots on an absorbent surface that will pull moisture from the base while the top is being dried in the air is the best solution.

As pottery dries poor techniques of making are revealed, for example, lack of consolidation in the base of thrown pots, poor joining of attached pieces such as handles and warping of flat ware such as tiles. Pressing the fingers firmly in the base of thrown pots and working across the base a few times will help to align the clay particles giving greater strength.

When attaching handles, ensure that the pot and the handle are as close as possible in moisture content, if there is less moisture in the handle it will dry quicker than the body of the pot and the join can be weakened.

Tile-making looks easy but can be one of the most difficult things to get right, it is essential that the clay is well worked with a roller to align the clay particles, avoid handling as much as possible and do not bend the tile. If a tile is bent, it will have a memory in the misaligned particles even if the piece is pushed back into shape, the “memory” will be revealed in the firing when the clay warps or cracks. When making batches of tiles try stacking them between sheets of plaster board; the absorbent quality of the board will pull moisture from the top and bottom of the tile equally

ensuring the tile remains flat. If using plaster-board it is most important to avoid getting it anywhere near to clay or slip to prevent contamination.

### **Cracks in Biscuit Ware.**

Most biscuit cracks originate from stresses in the forming process, for example, flexing a piece when handling it or bending a cast when removing it from a mould. Some shapes have a potential stress, larger flat ware in particular can develop stresses through handling. Uneven drying often causes cracking especially if the work warps and is then pushed back into shape; this causes the particles of clay to deform and when fired the “clay memory” bends the work again. “S” cracks in the base of thrown work can usually be corrected by applying pressure to the base while being thrown and by turning the base when leather hard. Cracked biscuit pieces are usually best discarded however minor cracks can sometimes be repaired with ceramic stopping made from a paste of powdered biscuit and sodium silicate.

### **Cracks in Glazed Ware: Dunting**

Dunts are cracks right through the article due to thermal stress or shock, if the edges of the crack are sharp then the crack happened on cooling after the glaze had set. If the edges are rounded you will be able to see that the glaze has gone into the crack, therefore the crack occurred on heating before the glaze became molten. Cracks occurring in the cooling phase can be caused by cooling too quickly or unevenly especially through the cristobalite inversion around 220°C, take care not to open the kiln until the temperature is much cooler. Cracking in the heating phase can be caused by heating the article too fast through the quartz inversion point at 573°C when a sudden expansion takes place. A slower heating speed will allow heat to be conducted through the work so the expansion occurs in the whole piece and not, for example just in the rim of a bowl. Sometimes stresses created in the making stage can survive the biscuit firing only to crack in the glaze firing when there are greater pressures because of glaze tension.

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