On drying pots before firing.

The pottery books tell the student to give his pots a substantial amount of time drying before firing. One test was to hold the pot to the cheek, and if it was cool there was still water to be evaporated. But how long? And how accomplished is my temperature sensing cheek?

After I had lost many pots by explosion in the kiln that had seemed to be quite dry before firing I decided to try the chemists scheme of drying to constant weight. A pot was thrown of Laguna B-mix cone 5. Once the pot was dry enough to move from the wheel it was placed in an unheated slightly closed garage, and weighed periodically as natural drying took place. Relative humidity varied between 30% and 50%, and temperatures varied from about 75 F in the day to 60 F at night. Careful measurements were made before and after each trimming operation so that weight of clay removed was not counted in the water loss. The final dry weight of the pot turned out to be about 1600 grams. The pot was 7 inches tall, 4.5 inches diameter, with a 8 mm thick wall. The bottom was a little thicker.

The water loss rate was approximately constant for the first three days at about 3 grams/hour. It then began to decline, and at the end of a week it was about a twentieth of that, about 0.15 grams/hour. Was all the water out? No, it was not!

The pot was placed in a 200 deg F electric oven and the weight followed. The loss rate became 10 grams/hour.

Drying was not fully complete in 6 further hours but finally seemed to be slowing down. About 50 grams more water were driven out by the 200-250 deg F oven treatment, which was 3% of the final dry weight. It was then successfully fired.

Drying is slow. If the pot is not fully dry when kiln firing starts, it better have many hours in the warmup stage before the kiln temperature rises above the boiling point of water, or 210 deg F or so.

Since then I have baked dried pots at 200 degrees F for at least 6 hours before kiln firing, and no longer have had kiln explosions.

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