

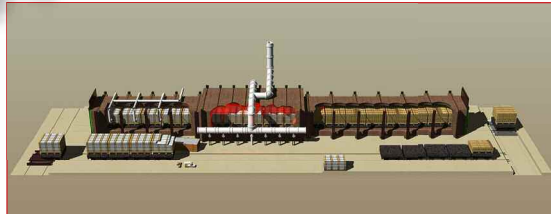
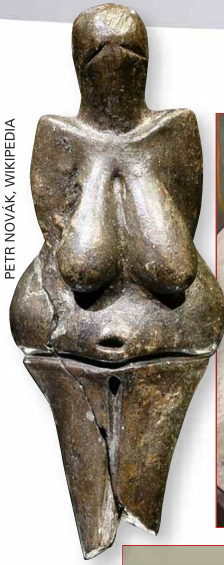
Ceramic Drying

Ceramic drying in general

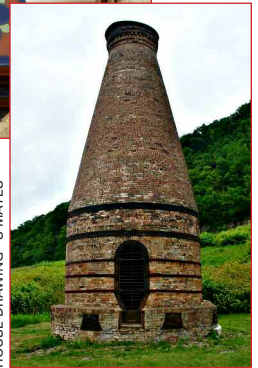
The word ceramic comes from the ancient Greek word Keramos which was the description for pottery made of burned clay mineral. The oldest ceramic object discovered is the statue of "Venus of Dolní Věstonice". It was found in Brno, Czech Republic. This statue proves that even 27,000 years ago ceramic production was known to mankind.

Today, the term 'ceramic' includes a much broader list of products. For example, each of these products belong to the ceramics family; structural ceramics (e.g. bricks), white ware ceramics (e.g. tableware), refractory ceramics (e.g. kiln lining) and technical ceramics (e.g. insulators).

PETR NOVÁK, WIKIPEDIA



HEADLAND ARCHAEOLOGY HOUSE DRAWING - S MAYES



Clockwise from above left: The oldest ceramic object discovered is the statue of "Venus of Dolní Věstonice". . . a modern ceramics stacking kiln . . . bottle kiln . . . tunnel dryer.

Facts & Figures

- The Space Shuttle's heat protection layer is mostly made from silica ceramic materials. This protects the spacecraft from the extreme 1,260 °C heat on re-entry into the Earth's orbit.
- Hard ceramic materials such as titanium carbide achieve 93 hardness on the Rockwell scale. Diamonds are the hardest material on Earth with a Rockwell hardness of 100.
- According to the Ceramic World Review magazine, regionally, Asia produces 65% of the world's ceramic tiles.

Ceramic is generally considered an inorganic, fine grained, non-metallic raw material that is mixed with water and shaped in molds at room temperature. After the ceramic (at that stage called 'green body'), has sufficiently dried it acquires its final properties during the burning process that generally takes place at 700 °C and above.

The first ceramics were simply dried outside and then burned in an open fire. Today, there are many varieties of dryers such as band, batch and tunnel dryers which are used, together with electrical, microwave assisted and bottle kilns.

Why the need to measure humidity?

Drying is a critical stage in ceramic manufacture. The drying process sometimes places more stress on the ceramic pieces than during firing because the drying needs to be done slowly, to prevent warping and cracking of the green body pieces. Yet, ceramic manufacturing companies need to minimize time for this process for efficient production. The drying time without a commercial dryer can be between two days and a week. For

continued

Why the need to measure humidity? *(continued)*

larger, thicker pieces, it can even take up to two weeks. Drying clay properly is especially critical. If a clay piece is not completely dry before the first firing, it will crack, warp or even explode, risking ruining not only that piece, but also other pieces in the kiln. On the other hand, if the clay has been dried too quickly in a drying chamber, cracks will form and the piece will likely be destroyed during firing in the kiln.

There is a small margin between fast drying and ruining the ceramic material. The best and fastest drying results can only be achieved if the environment in the dryer is accurately controlled for temperature, humidity and also air



Ceramics Factory producing roof tile . . . handmade ceramics.

velocity. These parameters have a big influence on the rate of drying and therefore the drying quality.

The temperature of a typical drying cycle varies between 35 °C up to 120°C, starting with the low

temperature and then slowly increasing as the green body gets drier. Precise measurement of the humidity inside the dryer helps to determine the stage of the drying process.