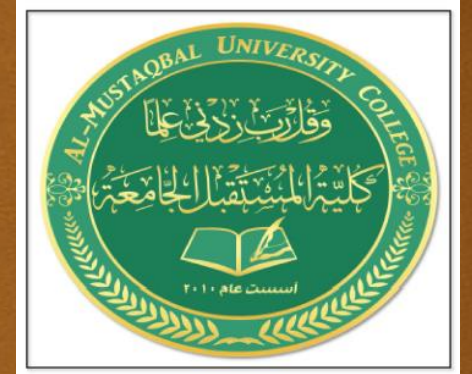


**Al-mustaqbal University college**



**Building and Construction Engineering  
Department**

**Constructional Technology**



**2<sup>nd</sup> Class  
Lecture (4)**

**Ruqayah Hayder**

## *Brick manufacturing process*

### *Drying*

- Must be carried out prior to firing
  - Drying enables such bricks to be stacked higher in the kiln without lower bricks becoming distorted
  - Also enables the firing temperature to be increased more rapidly
- Drying is carried out in chambers and takes several days

Clay products can be dried in

1- open air driers

2- artificial driers.



The artificial driers are of two types

1- the hot floor drier.

2- the tunnel drier.

## Firing

- Firing is to cause localised melting (sintering) of the clay which increases strength and decreases the soluble salt content without loss of shape of the clay unit
- The main constituents of the clay –silica and alumina –do not melt

• *The main stages of firing are:*

100°C –evaporation of free water

400°C –burning of carbonaceous matter 900-1000°C –  
sintering of clay

• Engineering bricks normally fired at higher temperature

## Clamps •

Bricks are stacked in large special formations on a layer of breeze, though the bricks also contain some fuel

- The breeze base is ignited and the fire spread slowly through the stack, which contracts as the bricks shrink on firing
- The process may take up to one month

## *Continuous Kilns*

- Widely used, Comprise a closed circuit of about 14 chambers arranged in two parallel rows with curved ends • Fire is directed to each chamber in turn
- Drying is carried out prior to the main firing process and is achieved by warm air obtained from fired bricks during cooling
- The kilns are describe as continuous, since the fire is not extinguished It is simply diverted from one kiln to the next

## *Additives in brick*

1- Fly ash: A waste material available in large quantities from thermal power plants can be added. The proportion of fly ash mixed as an additive to the brick earth should be optimum to reduce drying shrinkage, check drying losses and to develop strength on firing without bloating or black coring in fired product.

2- Sandy loam: Addition of sandy loam is often found effective in controlling the drying behavior of highly plastic soil mass containing expanding group of clay minerals.



3- Rice husk ash: The ash should preferably have unburnt carbon content in the range of 3–5% and should be free from extraneous material. It can be used with plastic black red soils showing excessive shrinkage.

4- Basalt stone dust: Basalt stone occurs underneath the black cotton soil and its dust is a waste product available in large quantity from basalt stone crushing units. The finer fraction from basalt stone units is mixed with soil mass to modify the shaping, drying and firing behaviour of bricks