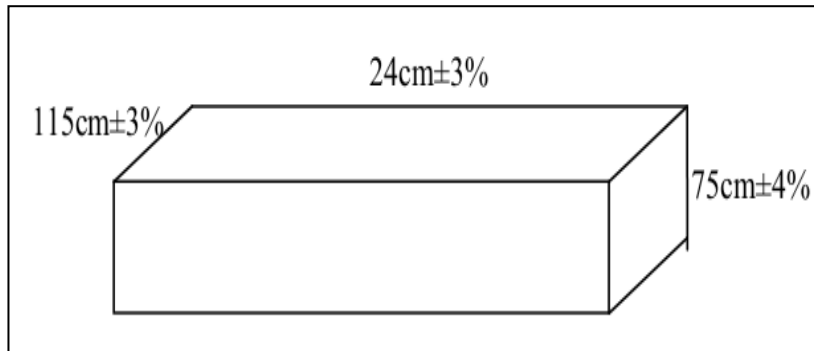


BRICKS

Appearance:

A good brick should be rectangular in shape with smooth and even surfaces. They shall be free from cracks and flaws and nodules of free lime.

Dimensions: A good brick shall have standard dimensions as shown below:



Engineering Properties of Bricks

The following are the required properties of good bricks:

(1) Color: Color should be uniform.

(2) Shape: Bricks should have plane faces. They should have sharp and true right angled corners.

(3) Size: Bricks should be of standard sizes as prescribed by Iraqi standard No. 24 and 25 in 1988.

(4) Texture: Bricks should not possess fissures, cavities, loose grit and unburnt lime.

(5) Soundness: When struck with hammer or with another brick, it should produce metallic sound.

(6) Hardness: Finger scratching should not produce any impression on the brick.

(7) Compressive Strength: It should confirm the requirements listed in table (1) depending on grade of brick.

(8) Water Absorption: After immersing the brick in water for 24 hours, water absorption should confirm the requirements listed in table (1) depending on grade of brick.

(9) Efflorescence: Bricks should not show white patches when soaked in water for 7 days and then allowed to dry for 3 days. White patches are due to the presence of sulphate of calcium, magnesium and potassium.

(10) Thermal Conductivity: Bricks should have low thermal conductivity, so that buildings built with them are cool in summer and warm in winter.

* Sound Insulation: Heavier bricks are poor insulators of sound while light weight and hollow bricks provide good sound insulation.

* Fire Resistance: Fire resistance of bricks is usually good. In fact bricks are used to encase steel columns to protect them from fire.

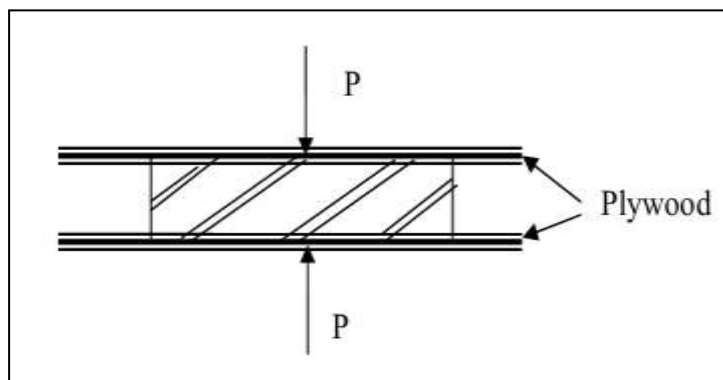
Tests on bricks:

The raw materials and the manner and degree of burning influence the physical properties greatly and therefore wide ranges in values are to be expected for each property.

Compressive strength:

The test is carried out in accordance with Iraqi standard No. 24. The brick placed between two plywood sheets and carefully centered between plates of the compression testing machine. The load shall be applied at a uniform rate until failure occurs.

$$\text{Compressive strength} = \text{Load at failure} / \text{Cross sectional area subjected to load}$$



Water absorption:

The absorption of water by brick is often considered to be indicative of its probable durability. The test also provides a means of checking on the consistency of the bricks produced by one factory. In this test the specimen shall be dried to constant weight in a ventilated oven at 110 °C to 115 °C for about 48 hours. Next the specimen shall be completely immersed in clean water for 24 hours. Each specimen shall then be removed, the surface water wiped off with a damp cloth and the specimen weight.

$$\text{Water absorption} = \{(W2-W1)/W1\} * 100\%$$

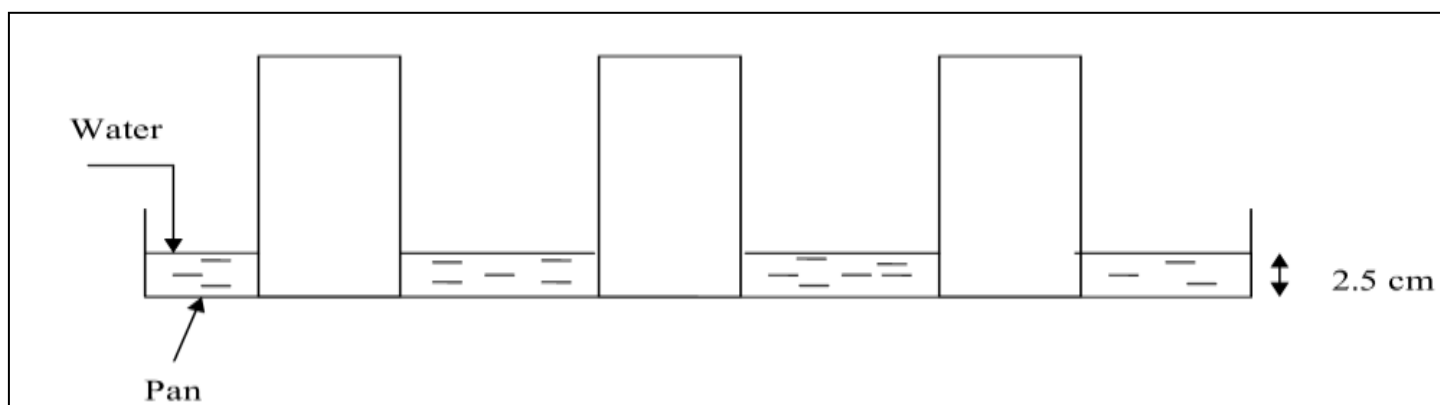
Where

W2 - weight of brick after 24 hours in water

W1- weight of dry brick

Efflorescence:

Soluble salts, if present in bricks, will cause efflorescence on the surface of bricks. Efflorescence test is carried out in accordance with Iraqi standard No. 24. The test is very useful for comparing samples of bricks from different sources, such as when we want to test bricks from several different factories at one time. In this test take a representative sample of 10 bricks and place //them on end in the pan containing distilled water to a depth of 2.5 cm for 7 days. Allow the bricks to dry for 3 more days in similar pan not containing water.



The efflorescence shall report as:

- ✚ Nil - No effloresce visible.
- ✚ Slight - A thin deposit of salts on less than 10% of the area of the brick.
- ✚ Moderate- A heavier deposit of salts covering between 10-50% of the area of the brick, but no powdering or flaking of the surface.
- ✚ Heavy - A heavy deposit of salts covering more than 50% of the area, but no powdering or flaking of the surface.
- ✚ Serious - A heavy deposit of salts and some powdering and flaking of the surface.

Compressive strength, water absorption and effloresce according to Iraqi standard No. 25/1988:

Grade	Effloresce	Minimum compressive strength N/mm ²		Maximum water absorption %	
		For one brick	Average for 10 bricks	For one brick	Average for 10 bricks
A	Slight	16	18	22	20
B	Slight	11	13	26	24
C	-	7	9	28	28