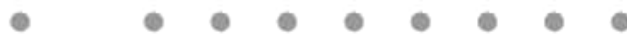


ENGINEERING MATERIALS SESSIONAL

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Experiment No.

12

ASTM

C 260

TITLE

Determination of Tensile Strength of hydraulic cement mortars

INTRODUCTION

This test covers determination of Tensile Strength of hydraulic cement mortars employing the briquet specimens



SIGNIFICANCE

Researchers in the field of hydraulic cement have the interest to improve tensile strength

APPARATUS

- ❖ Weights and weighing device
- ❖ Glass graduates
- ❖ Briquet molds [Made of metal and have sufficient material in the sides to prevent spreading during molding. Width of mould, between inner faces, at waist line of briquet is 1"] • • • •

APPARATUS

- ❖ Trowel
- ❖ Testing machine
- ❖ Clips [to hold the tension test specimen]



Testing Machine



Mortar Mixer



Briquet Mould

PROCEDURE

1. Proportioning, Mixing of Mortar

- a) Proportion of mortar with **1** part of cement to **3** parts of standard sand by weight
- b) The quantity of dry materials shall be not less than **1000** gms. And not more than **1200** gms. For making **6** briquets
- c) The percentage of water used in mortar shall depend upon the percentage of water required to produce a neat cement paste of normal consistency from the same sample of cement and shall be as indicated in table 12.1, the values being in percentage of the combined dry weights of the cement and standard sand
- d) Weight the dry material, place them upon a smooth non absorbent surface, thoroughly mix. Pour the water and mix ● ● ● ● ● ● ● ● ● ●

Table 12.1: Percentage of water for tensile test

Water for neat cement paste of normal consistency [%]	Water for mortar of 1 part cement to 3 parts standard sand [%]
15	9
16	9.2
17	9.3
18	9.5
19	9.7
20	9.8
21	10
22	10.2
23	10.3
24	10.5
25	10.7
26	10.8
27	11
28	11.2
29	11.3
30	11.5

$$y = \frac{2}{3} [P/(n+1)] + k$$

y = water required for sand mortar, %

P = water required for neat cement paste of normal consistency, %

n = number of parts of sand to 1 part of cement by weight

k = constant, 6.5



PROCEDURE

2. Molding test specimens

- a) Cover the molds with a thin film of mineral oil
- b) Fill the molds heaping full without compaction
- c) Press the mortar in firmly with thumbs **12** times to each briquet, at points to include the entire surface
- d) Smooth it off with trowel
- e) Cover the mold with plane glass or metal plate oiled with mineral oil and turn over the mold and plates rotating the mold about its longitudinal axis
- f) Remove the top plate
- g) Repeat the operation of heaping, thumbing, smoothing off

PROCEDURE

3. Storage of Specimen

- a) Keep all the specimen, immediately after molding, in the moist room for **20** to **24** hrs with their upper surfaces exposed to moist air
- b) Remove from the molds and immerse in storage tank

PROCEDURE

4. Tensile strength test

- a) Wipe each briquet to a surface dry condition
- b) Remove any loose sand grains from the surface that will be in contact with clips
- c) The bearing surfaces of the clips will be clean and free from sand
- d) Centre the briquet in the clips
- e) Apply loads

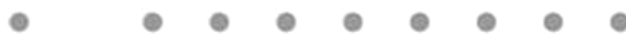
CALCULATION

Weight of cement and sand	= 1200 gm [6 specimen]
Cement : Sand	= 1 : 3
Weight of Cement	= ??????
Weight of Sand	= ??????
Normal consistency	= ?????? %
Water required	= ?????? %
Weight of water	= ?????? gms
w/c ratio	= ??????



Table 12.2: Stress Calculation

Curing [days]	Sample No.	Load [N]	Area [mm ²]	Stress [MPa]	Average Stress [MPa]
3	1	????	????	????	Stress = 0.9*Ave. to 1.1*Ave. Then Average or Not Averaged
3	2	????	????	????	
3	3	????	????	????	
7	1	????	????	????	Stress = 0.9*Ave. to 1.1*Ave. Then Average or Not Averaged
7	2	????	????	????	
7	3	????	????	????	



RESULT

Tensile strength of cement mortar at 3 days = ???? Mpa
Tensile strength of cement mortar at 7 days = ???? Mpa

DISCUSSION

- ❖ Temperature of mixing place [20 – 27.5°C]
- ❖ Temperature of mixing water, moist room [23±1.7°C]
- ❖ RH of laboratory shall not be less than 50%
- ❖ RH of moist room shall not be less than 95%
- ❖ Use rubber gloves while mixing
- ❖ Use no tamping

