

MIDDLE EAST TECNICAL UNIVERSITY

CIVIL ENGINEERING DEPARTMENT

CE 344

LABORATORY 1

GROUP:7

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### 1)

### i.

According to ASTM C204, S=Ss\*√T/√Ts. Where

*S* = specific surface of the test sample, m2/kg,

*S*s = specific surface of the standard sample used in

calibration of the apparatus, m2/kg ,

*T* = measured time interval, s, of manometer drop for test

sample,

*T*s = measured time interval, s, of manometer drop for

standard sample used in calibration of the apparatus.

For material A; S=3600\*9.25/10.2=3264.7 cm^2/gr.

For material B; S=1833.9 cm^2/gr.

For material C; S=3910.4 cm^2/gr.

For material D; S=3363.5 cm^2/gr.

### ii.

According to ASTM C150, fineness of the cements should be minimum 2800 cm^2/gr. In our calculation, cements A, C and D are finer than the required. But cement B is coarser than required. This will cause troubles such as less water requirement and less workability.

### iii.

According to ASTM C618, fineness of pozzolan can be controlled with the amount retained on wet-sieve analysis at 45μm. Maximum amount should be 34%. This means their Blaine fineness should aproximately be about 4200 cm^2/gr. So all our materials are coarser than pozzolanic materials.

### iv.

Specific surface area can not be determined experimentally. It is determined by calculations.

### v.

Density of cement is another control factor for design and concrete-mix control. Therefore it is important and should be checked (with respect to the codes ASTM C188).

## 2)

According to ASTM C305, apparatusus are mixer, paddle, mixing bowl, scarper and some supplamentary apparatus. The room temprature should be betweeen 20-27.5. The relative humidity of the room shall be higher than 50%.

### i.

For paste; put water and cement to the dry bowl and wait for 30 seconds. Mix at low speed for 30 seconds. Wait for 15 seconds and scape down the particles on sides. Then mix in medium speed for 60 seconds. That’s it.

### ii.

For mortar; put water and cement to the dry bowl and mix in slow speed for 30 seconds. Then start to adding sand which will last for 30seconds and continue to mix in this period. Start mixing at medium speed for 30s. Close the mixer and for 15 seconds and scape down the particles on sides. After closing the machine, total waiting time should be 90s. Mix at medium speed for 60s.

## 3)

According to ASTM C187, we should definitely make new samples until we catch the requirements. All samples should be done with fresh cement.

## 4)

By Poosing the sample one hand to another siz times the sample gets nearly spherical mass which is easly insert into the Vicat ring with minimum manipulation.It is defined on ASTM C187-98

## 5)

In Le Chatelier Method, only free CaO can be determined. However in autoclave method, both free CaO and MgO can be determined. When MgO amount in cement is important, autoclave method can give different results from Le Chatelier Method. Actually it is just where you do your job. Europian and Turkish standarts are based on Le Chatelier but in USA; ASTM standards are used which is with autoclave method.