

with acid) about 5 inches long by  $2\frac{1}{2}$  inches wide, and  $\frac{1}{4}$ -inch thick, so as to exclude all air and moisture.

The pats shall be about  $\frac{1}{2}$  in. thick in the centre, and shall be worked off to sharp edges on the four sides of the plate. They shall then be covered with a damp cloth and allowed to remain in the air until set, after which they shall be placed in vapor in the Fajja bath tank, in which the water is to be heated to a temperature of about 130 deg. Fah. After remaining in the vapor for 6 hours, including the time taken to set in air, they are to be immersed in hot water, and allowed to remain there for 18 hours. Upon their removal from the bath, the samples should not be curled up, should not have fine hair cracks nor be distorted, and should not have large expansion cracks. The samples, if separated from the glass, should break with a sharp crisp ring. If these conditions are satisfactorily fulfilled, it is believed that no free lime is present in a form that will prove detrimental. Cements when very finely ground, even if slightly overlimed, are not so liable to blow.

#### (5) TIME OF SETTING.

The time of setting shall be determined by noting the time required for a sample under test to bear a needle of 1-12 inch diameter loaded with one-fourth of a pound, and 1-24 of an inch diameter loaded with 1 pound, the mortar under test being of the consistency of rather stiff plaster or mortar. The percentage of water used shall be stated in the report.

For more accurate determination, a brass or rubber mould, 10 c. m. in diameter and 4 c. m. high, is filled with neat cement mixed to such a plastic consistency that a plunger of 1 c. m. diameter and loaded with 300 grammes, penetrates to a point 6 m. m. from the bottom. Setting commences when a needle, of 1 square m. m. section, first refuses to sink entirely through "the mould." Setting is complete when the needle rests upon without penetrating the surface.

#### (6) TENSILE AND COMPRESSIVE TESTS.

The strength of Portland cements shall be determined by testing neat cement and, if required, a mixture of neat cement and quartz sand. The tests shall be made in a uniform manner (both for tension and compression) with briquettes of the same form and same cross section and with the same apparatus.

NEAT CEMENT.—Neat tests, except where fineness, specific gravity and hot bath blowing tests are also made, are misleading as to the value of a cement. Briquettes of neat cement, in which these characteristics have been determined and found to be satisfactory, shall bear a tensile stress of 250 lbs. per square inch at