

The sand for standard tests shall be quartz, crushed so that the whole can pass through a sieve of 400 meshes to the square inch, but sufficiently coarse to allow of the whole being retained by a sieve of 900 meshes to the square inch.

### (3) SPECIFIC GRAVITY.

The specific gravity is for the purpose of determining the degree of calcination of a cement with certainty, and is, therefore, of great importance. The specific gravity of a Portland cement shall be at least 3.09, and shall not exceed 3.25 for fresh cements, the term "fresh" being understood to apply to such cements as are not more than two months old. The gravimetric system is recommended for the determination of the specific gravity.

Portland cement improves with age, provided it is properly stored and kept in air-tight bags or barrels. Specifications, therefore, should not prescribe *only fresh* cement.

The following description of the method of carrying out this test is taken from a paper on "Testing of Portland Cement," by Gary, Trans. Amer. Soc. of Civil Engineers, October, 1893.

"The determination of the specific gravity of the cement particles by the volume-meter of Schumann, is a well-known uniform method. This consists of a glass bottle of about 200 cu. cm. (12 2 cu. in.) capacity, with a calibrated glass tube in its neck. The bottle is nearly filled with oil of turpentine, the tube tightly inserted and filled by a pipette with the same oil to the zero mark of the scale, care being taken that all air bubbles are removed. One hundred gr. (3.5 oz.) of cement is put in through the tube, which is then closed by a cork. When the fluid becomes clear, the height of its top surface is noted on the scale. The weight of the cement, divided by its volume, as determined by the scale of readings, gives the specific gravity. To secure precise results, it is necessary that the temperature should remain uniform throughout the experiment, and hence vessels, cement and oil must have been kept in the same room for some considerable time. In hot weather the apparatus can be put into water of a known constant temperature. If 100 gr. of cement are used, a rise of 1° Cent., between the two readings decreases the specific gravity 0.8 per cent."

### (4) BLOWING TEST (FOR FREE LIME, ETC.)

The hot bath test for detecting the presence of free lime, etc., shall be carried out in the following manner: Mortar pats, prepared of neat cement and thoroughly worked, shall be troweled upon ground glass plates (carefully cleaned, preferably