INTRODUCTION

Soil particles, or “ultimate soil particles,” are the discrete units which comprise the solid phase of the soil. They generally cluster together as aggregates, but can be separated from one another by chemical and mechanical means. The particles have diverse composition and structure, and generally differ from one another in both size and shape. They may be organic or inorganic, crystalline or amorphous. The methods described herein will apply only to the inorganic particles, the typical ones being single crystalline fragments.

Particle size is a parameter having the dimension of length, and defined by one or another of several arbitrary criteria, such as (1) the width of the smallest square opening, or the diameter of the smallest circular opening, through which the particle can pass, (2) the diameter of a circle having an area equal to the maximum projected area of the particle, (3) the diameter of a sphere whose volume is equal to that of the particle, and (4) the diameter of a sphere whose density and settling velocity (in a given fluid) are equal to those of the particle. These criteria all agree for spherical particles, but not for the anisometric particles commonly found in the soil. Hence, the recorded results of a particle-size measurement should always be accompanied by a notation of the method used.

The particle-size distribution of a soil expresses the proportions of the various sizes of particles which it contains. The proportions are commonly represented by the relative numbers of particles within stated size classes (i.e., by their frequency ratios), or by the relative weights of such classes. The determination of a particle-size distribution is commonly referred to as a particle-size analysis, a term which has largely superseded the older and somewhat ambiguous term “mechanical analysis” (Soil Sci. Soc. Am., 1946, 1949; Am. Soc. Testing Mater., 1959; Inst. Chem. Eng., 1947, p. 114).