A Simplified Air-Picnometer For Field Use

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The growing appreciation of the significance of the physical properties of soils as factors in crop growth has led to an increasing number of investigations of these properties and of cultural practices that affect them. One of the properties that has proven to be useful in characterizing the physical nature of the soil is the percentage of the soil volume that is occupied by air. This value can be obtained by calculation from the measured value of the bulk density, moisture content, and particle density of the sample. It can also be determined directly by means of a device known as an air-picnometer (2, 3, 4). The versatility and easily operating characteristics of the device described in this article make it a useful instrument for the field evaluation of soil physical conditions.

To measure the volume of air-filled voids, a soil sample of known volume is placed in an air-tight system in which the gas pressure is known. The volume...