

Density Applications

Reducing the weight of some products is often desirable for performance as well as economic reasons. Many manufacturers strive to develop materials that are partially porous yet still fulfill their function. Density measurements play a key role in these developments. In other products, preventing porosity is important. Closed air bubbles (cells) are desirable in home-insulating materials, but an open cellular structure is required for automobile and furnace filters. Producers thus keep a check on closed and open cells by density evaluation.

A noted decrease in density from a reference value can indicate a void within the product, an undesirable situation for some manufactured products such as those composed of laminates. An increase in density may indicate a process is optimized. For example, the density of a polymer increases as it approaches its crystalline state.

The number of industries that depend on density determination is extensive. In the agricultural industry, the density of grains, feeds, tobacco, fertilizer, insecticides, and soil samples are measured. The ceramic industry uses density and specific gravity measurements on ceramic whiteware materials. In the pharmaceutical industry, density measurements are correlated with solubility rates of powders and tablets. The production of construction materials such as insulation, bricks, and tiles requires the determination of absolute density. The manufacture of carbon and graphite materials requires bulk density measurements. Studying the reaction rate of porous catalysts is augmented by measurements of particle density and volume. Other industries that benefit from density measurement include plastics, glass, powder metallurgy, paint, textile, and pulp and paper.

From raw material to finished product, density measurements support a wide variety of industrial needs. Micromeritics' experience in the field of density measurement began in 1961, when we introduced our first hand-operated helium pycnometer. In 1981 we developed the first commercial automatic gas pycnometer. Today, Micromeritics is a leading provider of instruments that determine density. We support these products with a worldwide network of personnel trained in applications and service support. Our pycnometers deliver fast, accurate, and reliable measurements to determine absolute, envelope, and bulk density measurements.

A partial list of materials that utilize density determination

Carbon black	Coke	Lactose	Resins
Carbon cloth	Dolomite	Limestone	Silica
Catalysts	Film	Metal parts	Starch
Cement	Foam	Nickel	Talc
Ceramic	Graphite	Pigment	Tungsten carbide
Clay	Iron oxide	Polyester fiber	Zeolite
Coating powder	Kaolin	Quartz	Zinc oxide