Talc

Ubiquitous and useful, talc is a mineral mined in more than 40 countries and distributed and used worldwide. U.S. Geological Survey (USGS) Talc Commodity Specialist Robert Virta and USGS Talc Resource Specialist Brad Van Gosen prepared the following information about talc.

When most people think of talc, they probably think of talcum and baby powder. However, these uses of talc are quite minor compared to its wide variety of applications in manufacturing. The leading use of talc is in the production of ceramics, where it acts as a source of magnesium oxide, serves as a flux to reduce firing temperatures and improves thermal shock characteristics of the final product.

Talc is a hydrous silicate composed of magnesium, silicon, oxygen and water. Although relatively pure in composition, talc can contain small amounts of aluminum, iron, manganese and titanium, which can give it a range of colors, from white, to apple green, to dark green or brown. Composed of weakly bonded microscopic platelets, talc is the softest mineral known.

The physical and chemical properties that make talc commercially useful include chemical inertness, fragrance retention, high dielectric strength, high thermal conductivity, low electrical conductivity, oil and grease adsorption, high purity, softness and whiteness. In addition to ceramics, talc is used in cosmetics, paint, paper, plastics, roofing, rubber and a variety of other materials.

In cosmetics, talc imparts softness and lubricity to products, improves blemish coverage, retains fragrances and improves oil adsorption. In paint, talc improves the hiding properties of paint, strengthens the paint film, smoothes ridges left during brush applications, helps prevent settling of components in the paint can and improves corrosion resistance for painted metals. Talc is used in paper to adsorb tree sap, thereby preventing blemishes, filling interstices between cellulose fibers, reducing paper transparency and improving ink receptivity.

In plastics, talc reduces the amount of expensive resins required in the product, improves dimensional stability, reduces permeability of plastic films, improves flexibility and strength of the plastic product, and improves heat resistance. Talc also acts as a lubricant in the plastic molding machines. For roofing, talc increases the viscosity of the bitumen, improves weathering characteristics of the product and prevents sticking of asphalt-saturated felts and shingles.

Talc is used in rubber as filler to reduce the amount of expensive resin required, increases stiffness of uncured rubber compounds, improves rigidity in the product, and acts as a lubricant and anti-stick agent in manufacturing. In adhesives and caulks, talc controls viscosity, reduces film permeability and reinforces the adhesive film. Talc also is used in agricultural applications as a chemical carrier for herbicides and pesticides or as a fruit dusting agent.

In the United States, talc is mined in six states, with Montana being the leading producer, followed by Texas, Vermont, New York, Virginia and Oregon. In 2006, U.S. production was estimated to be 880,000 metric tons of crude talc ore valued at $25 million. Domestic sales were

estimated to be 861,000 metric tons, valued at $75 million. In 2006, U.S. manufacturers also used 310,000 metric tons of imported talc.

World production of crude talc ore in 2006 was estimated to be about 6.5 million metric tons. The leading producer was China with 3 million metric tons, followed by the United States with 880,000 metric tons, Finland with 550,000 metric tons, India with 545,000 metric tons, Brazil with 401,000 metric tons, and France with 350,000 metric tons. These six countries accounted for an estimated 88 percent of world talc production in 2006.

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Sample of talc from *Minerals in Your World*.