

Factsheet

Mineral Sands



An introduction to Mineral Sands

What are Mineral Sands?

Mineral sands are typically old beach or dunal sands that contain concentrations of important titanium minerals (including rutile and ilmenite) and zircon. These minerals are physically heavy and are also called 'heavy minerals'.

Mineral sands can be used for a variety of industrial purposes and are found in a range of everyday consumer goods such as pigment for paint, paper and plastics as well as toothpaste, sun cream and homewares such as ceramics.

Because of their widespread use in industrial and consumer goods, demand for mineral sands is strongly linked to GDP growth. New housing construction, growth in floor space, health of emerging economies and the seasonal northern hemisphere painting season (dry and warm months) are all key drivers of demand for mineral sands.



(Image: ilmenite (left) and zircon (right))

How are Mineral Sands Deposits Formed?

Titanium and zircon minerals contained within granite rocks are washed by river systems into the ocean over very long periods of time. Mineral sands deposits are most commonly formed along beaches and coastal dunes from the natural concentration of heavy minerals by wave and wind activity.

How are Mineral Sands Extracted?

Mineral Sands deposits can be mined using dry mining or wet mining techniques. Wet mining can involve dredging the ore from a pond or using powerful hoses to create a slurry. Dry mining uses traditional earth moving equipment such as dozers and trucks.

Mineral sands deposits generally host a heavy mineral percentage of 1%-15% in the ore but the relative content of the individual minerals within the ore varies widely from deposit to deposit.

Australia, Africa, India and China are the world's main sources of mineral sands.

Australia and Africa are the largest producers of titanium minerals, and account for more than half of global zircon production.

Mineral Sands Products and Uses

Ilmenite, leucoxene and rutile (titanium dioxide)

Titanium dioxide (TiO_2) based products are categorised based on the level of TiO_2 they contain. The higher the TiO_2 the more valuable the product.

- Ilmenite (45% to 65% TiO_2)
- Leucoxene (65% to 90% TiO_2)
- Rutile (90% to 100% TiO_2)

These minerals are primarily used as feedstock for the production of titanium dioxide pigment, with a



small percentage also used in the production of titanium metal and fluxes for welding rods and wires.

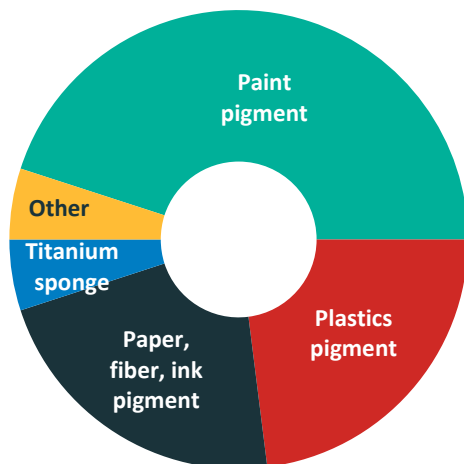
Titanium dioxide is the most widely used white pigment because of its non-toxicity, brightness and very high refractive index

Titanium dioxide pigment is an essential component of consumer products such as paint, plastics and paper.

Key uses

- Paint and coatings account for half of all pigment consumption
- The plastics industry, is the second largest market, accounting for just over a quarter of TiO₂ consumption
- The remaining production is allocated evenly across coated paper, paper laminate, fiber and ink manufacturers
- The other major use of titanium feedstock is the production of titanium metal which is used by the aircraft, space, defense, industrial, medical and sporting goods industries

Titanium Dioxide uses



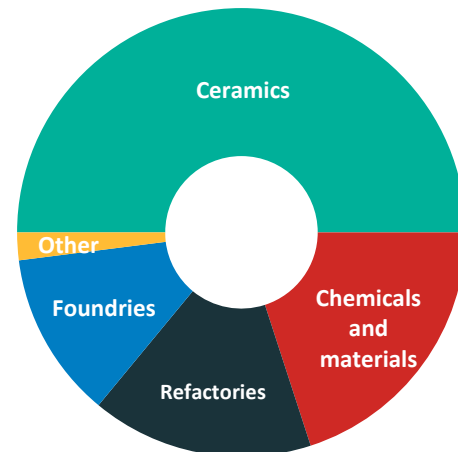
Zircon

A by-product or co-product in most mineral sands deposits, zircon is primarily used within the ceramics sector. Ceramic tiles account for more than 50 per cent of global zircon consumption. Milled zircon enables ceramic tile manufacturers to achieve brilliant opacity, whiteness and brightness in the glaze or body of their products.

Other uses

- Zircon's unique properties include heat and wear resistance, stability, opacity, hardness and strength. These properties mean it is sought after for applications such as refractories, foundries and specialty chemicals
- Zircon also has minor uses in the nuclear power and medicine industries

Zircon uses



About Base Resources

Base Resources is an Australian based, Africa focused, mineral sands company with an established operation in Kenya and a world class development opportunity in Madagascar.

Base Resources is listed on the Australian Securities Exchange (ASX: BSE) and the UK's Alternative Investment Market (AIM: BSE). For more on Base Resources visit www.baseresources.com.au

