

# TITANIUM

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**T**itanium dioxide demand is recovering slowly from the trough of 2001, but feedstock markets are oversupplied.

## **TiO<sub>2</sub> pigment**

Titanium dioxide pigment accounts for more than 90% of the consumption of titanium minerals. TiO<sub>2</sub> is the brightest of the white pigments and its main applications are in the manufacture of paints, paper and plastics. Consumption is concentrated in North America and Europe which, combined, account for more than half of world demand.

TiO<sub>2</sub> pigment production increased by 3.9% to 3.98 Mt in 2002, according to estimates prepared by industry consultants TZMI. Although robust in percentage terms, the recovery was from the extremely depressed level of 2001, when global consumption fell by 4%. Inventory building by consumers may also have inflated the apparent consumption estimates.

In the US, apparent consumption is estimated to have increased by 2.5%, based on data from the US Geological Survey.

Pigment prices declined through the first half of 2002, tumbling by as much as US\$350/t, then recouped half of these losses in the later part of the year. In early 2003 some producers have posted a further increase of US\$100/t, but it remains to be seen whether these will stick.

A number of expansions in pigment capacity were implemented during the year, and several are continuing through 2003. Kerr-McGee Chemical Corp. is increasing capacity at the Hamilton (Mississippi) plant by 40,000 t to 225,000 t/y by the end of 2003, and the Savannah (Georgia) plant is being increased by 25,000 t to 110,000 t/y. In Finland, Kemira is increasing capacity at Pori to 150,000 t. However, Huntsman postponed expansion plans at the sulphate plants in Huelva (Spain) and Tengganu (Malaysia). In aggregate, pigment capacity is estimated to have increased by 2.1% to 4.50 Mt in 2002.

## **Titanium metal**

The titanium metal market was adversely affected by the collapse in commercial aircraft production in 2002. Despite the depressed market, Sumitomo Titanium proceeded with an expansion of capacity at the Amagasaki plant. Capacity increased by 3,000 t to 18,000 t/y, although production remained at the earlier level. Although commercial aircraft production is expected to remain depressed for some years, demand for military applications could be boosted as a consequence of the war in Iraq.

### **Titanium feedstocks**

Titanium feedstock production decreased by 1.5% in 2002, to 4.64 Mt according to TZMI. Reported production declined by 4%, with a sharp decline in slag production being only partially offset by higher natural rutile output. High zircon prices are supporting TiO<sub>2</sub> feedstock output at a number of operations.

Demand for slag has been reduced more than other feedstocks because of the higher cost of pigment production from slag, compared to alternative feedstocks. Surplus stockpiles of slag will hamper a recovery in production, even after demand improves. In Canada, QIT closed one of nine slag furnaces, and in South Africa, Richards Bay Minerals reduced slag output to about 80% of capacity.

Kerr-McGee Corp. announced the permanent closure of the 200,000 t/y synthetic rutile plant at Mobil (Alabama) by the end of 2003.

Despite depressed market conditions, a number of feedstock projects moved towards production during the year. Ticor South Africa is commissioning the first of two furnaces at Hillendale. Start-up is scheduled for the second quarter of 2003, and the second furnace is already under construction. Final capacity will be 250,000 t/y of slag and 50,000 t/y of rutile.

Anglo American plc is progressively increasing slag output from the second furnace at Namakwa Sands in South Africa.

Iluka Resources Ltd increased output at Old Hickory in Georgia, US, adding a new mine and a concentrator. The increases will offset reduced output at Green Cove Springs when dredging operations cease.

In Australia's Murray Basin, MBT remains the sole producer. Output at its Wemen mine is slowly ramping up to capacity of 30,000 t/y of rutile and 30,000 t/y of ilmenite.

In Western Australia, Doral Mineral Sands commissioned the Dardenup project. Production is planned to reach 110,000 t/y of ilmenite.

In Brazil, Millenium Chemicals added a new dredge and concentrator, increasing capacity by 10% to 120,000 t/y of ilmenite and 2,000 t/y of rutile.

In addition to these expansions, plans for further increases threaten the market with prolonged oversupply. In the Murray Basin, production at the Pooncarie mineral sands project, which includes the Ginko deposit, is scheduled to begin in 2004. The project is now wholly owned by BeMax Resources, and production plans are underpinned by offtake agreements with Du Pont and Cristal Pigment (National Titanium Dioxide of Saudi Arabia). Cristal has also taken equity in BeMax. Iluka is proceeding with development of the Douglas deposit, acquired in the takeover of Basin Minerals in 2002. The development decision is expected in late 2003, with first production in late 2005 or early 2006.

In India, IRE is increasing ilmenite production at Manavalakurichi and Chavara. Capacity will be increased by 60,000 t/y at each facility by late 2004. Ticor is proceeding with development of the Orissa Mineral Sands Complex at Chatrapur in conjunction with Austpac Resources. However, the company has suspended development at Kudiraimozhi and Navaladi, both in Tamil Nadu, preferring instead to collaborate with local companies that already have export licences.

Looking further forward, the feasibility study has been completed for phase one of the giant Corridor Mineral Sands project in Mozambique, now wholly owned by WMC Resources. Phase one of the project entails construction of three furnaces with a capacity of 375,000 t/y. Subsequent construction phases will increase production to 1.0 Mt/y across 15 years. Kenmare Resources has received environmental approval for the Moma Titanium Mineral Sands Project, also in Mozambique. Design capacity is 600,000 t/y of ilmenite. Start-up is scheduled for 2005.

In March this year the US agency, Overseas Private Investment Corp. announced that it was providing a US\$25 million investment guaranty for the restart of Sierra Rutile Ltd's mining operations in Sierra Leone. When civil conflict halted operations there in 1995 it was producing around 148,000 t/y of rutile and 59,000 t/y of ilmenite. When phase one of the restart is completed, output is expected to be about 110,000 t/y of rutile and 20,000 t/y of ilmenite.

### Outlook

While demand for titanium will recover with the overriding economic cycle, feedstock markets are threatened with prolonged recession by surplus inventories, excess capacity and potential increases from new projects.

### Natural Rutile Production Capacity ('000 t/y)

	2000	2001	2002
Australia	220	230	250
South Africa	140	140	160
US	50	50	50
Others *	10	10	10
<b>W. World Total</b>	<b>420</b>	<b>430</b>	<b>470</b>

Note: \* Does not include CIS.

Source: Smith Barney estimates.

### Ilmenite Production Capacity ('000 t/y)

	2000	2001	2002
Australia*	2,300	2,300	2,300
India	400	400	400
Malaysia	30	30	30
Sri Lanka	80	80	80
Brazil	100	120	120
US	460	460	460
Norway	300	300	300
<b>W. World Total</b>	<b>3,700</b>	<b>3,700</b>	<b>3,700</b>

Note: \* Includes ilmenite used in synthetic rutile. NB - Canadian and South African ilmenite production used in slag production is omitted. Source: Smith Barney estimates.

**Synthetic Rutile Production Capacity ('000 t/y)**

	2000	2001	2002
Australia	670	670	670
India	90	90	90
US	100	100	100
Other	30	30	30
<b>W. World Total</b>	<b>900</b>	<b>900</b>	<b>900</b>

Source: Smith Barney estimates.

**Titanium Dioxide Pigment Production Capacity ('000 t/y)**

	2000	2001	2002
Americas	1,760	1,730	1,730
W. Europe	1,450	1,440	1,470
Japan	340	340	340
Australia	170	180	200
Others	697	697	697
<b>World Total</b>	<b>4,450</b>	<b>4,450</b>	<b>4,500</b>

Source: USGS and Industry Sources.

**Titaniferous Slag Production Capacity ('000 t/y)**

	2000	2001	2002
Canada	1,000	1,000	1,000
South Africa	1,100	1,200	1,200
Norway	150	150	150
<b>W. World Total</b>	<b>2,250</b>	<b>2,350</b>	<b>2,350</b>

Source: Smith Barney estimates.

**Titanium Sponge Production Capacity ('000 t/y)**

	2000	2001	2002
US	21,500	14,700	14,700
Japan	24,700	24,700	27,200
China	3,000	3,000	3,000
CIS	42,000	42,000	42,000
<b>World Total</b>	<b>91,200</b>	<b>84,400</b>	<b>86,900</b>

Source: Smith Barney estimates.