

# TITANIUM

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**T**he titanium markets slumped in 2001 in response to deteriorating global economic conditions. Curtailments in pigment production reduced demand for feedstocks, but feedstock production increased slightly.

## 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 together account for more than half of world demand.

Global pigment demand weakened progressively through the year. Based on data covering the first three-quarters, TZMI estimates that demand fell by 3.8%. In the US, consumption is estimated (based on US Geological Survey data) to have fallen by 5%.

Declining consumption was met by production cuts. Millennium Chemicals closed their 44,000 t/y sulphate pigment plant at Baltimore, Maryland, in September 2001. Kerr-McGee Chemical Corp (KMCC) closed their 30,000 t/y sulphate plant in Antwerp, Belgium, in December. European production is estimated to have declined by nearly 4%, according to TZMI. In the US, Bureau of Census data shows that production fell by 5%. In the fourth quarter consumption slumped 7% year-on-year and inventories moved sharply higher.

TiO<sub>2</sub> pigment prices weakened through the year. In Asia, attempts to increase prices by as much as US\$100/t early in the year were only partially successful, but rises of around US\$20/t were implemented. In Europe, price rises of □150/t were implemented early in the year. During subsequent months however,

prices declined steadily, falling US\$250/t from the first quarter high. In early 2002 producers are posting price increases, but success seems unlikely given continuing weak market conditions.

Pigment plant capacity increases were limited to a number of modest expansions. Millennium Chemicals implemented debottlenecking programs at their plants at Ashtabula Ohio, adding 12,000 t/y and Kemerton in Western Australia (10,000 t/y). TiWest added 10,000 t/y of capacity at Kwinana, Western Australia. Kemira announced an expansion at the Pori, Finland, sulphate plant which will increase capacity by 10,000 t/y to 130,000 t/y by 2003. Huntsman Tioxide is proceeding with an expansion at Gretham, UK, which will add 20,000 t/y of capacity, but the planned expansion at Huelva, Spain, was postponed until market conditions improve.

The dramatic pace of consolidation of ownership, which has characterised the TiO<sub>2</sub> pigment industry over the previous three years, slowed in 2001. KMCC acquired the remaining 20% interest in two plants owned by Bayer. KMCC had acquired an 80% interest in 1998.

## Titanium Dioxide Pigment Production Capacity - 1999 to 2001 by Region ('000 t/y)

	1999	2000	2001
Americas	1,760	1,760	1,730
W.Europe	1,400	1,450	1,440
Japan	340	340	340
Australia	160	170	180
Others	500	520	540
World Total	4,200	4,200	4,200

Sources: USBM, Industry Sources

### Titanium Metal

The titanium metal market was buoyant through the first three-quarters of 2001. The events of September 11, however, threw the aircraft industry into depression and demand for titanium metal slowed. In Japan, sponge prices increased for the first time in three years, and capacity expansions were implemented in response. Toho Titanium announced plans to expand capacity by 11% to 12,000 t/y. Sumitomo Stix also increased capacity by 20% to 16,000 t/y. In the US, the closure of the Oremet sponge plant resulted in a sharp increase in sponge imports, as production of mill products increased 15%.

### Titanium Sponge Production Capacity ('000 t/y) - 1999 to 2001

	1999	2000	2001
US	21,500	21,500	14,700
Japan	24,700	24,700	27,200
China	3,000	3,000	3,000
CIS	42,000	42,000	42,000
World Total	91,200	91,200	86,900

Source: SSB

Post September 11, however, market conditions reversed. Consumers, especially the commercial aircraft industry, reduced orders. Timet announced production cuts at its facilities at Henderson, Nevada and Morgantown, Pennsylvania. VSMPO, Russia was asked to postpone contract deliveries indefinitely. The full impact of the sudden market weakness was yet to be felt by year end, because of the lengthy pipeline, and mill product prices had declined by a relatively modest 5%.

### Titanium Feedstocks

Titanium feedstocks comprise of several mineral and beneficiated products which vary in their titanium content and suitability for use in the different pigment production processes. In general terms, minerals with a higher TiO<sub>2</sub> content, rutile, synthetic rutile (a beneficiated

product of ilmenite) and some slags, comprise the chlorinatable feedstocks. They are used in pigment plants employing a chloride process, and sponge production. Only DuPont directly uses certain ilmenites as feed to chloride plants. Other grades of ilmenite and certain slags are soluble in sulphuric acid and are suitable for use as feeds to sulphate pigment plants.

### Natural Rutile Production Capacity - 1999 to 2001 by Region ('000 t/y)

	1999	2000	2001
Australia	220	220	230
South Africa	120	120	130
US	50	50	50
Others *	10	10	10
W.World Total	400	400	420

\* Does not include CIS

Source: SSB

Reduced final demand for titanium products in 2001 flowed through into the feedstock markets, reducing consumption. Production increased modestly however, and the consequent oversupply further depressed market conditions. Oversupply was most marked in chloride markets, where supply increases were greatest.

The major source of new supply in 2001 was from Tigor, South Africa. Commissioning of the Hillendale mine and concentrator began in the second quarter of 2001. Construction of the first furnace commenced and is due to be completed in early 2003. A second furnace is planned for 2004, doubling production. At full capacity, expected in 2005, output will be 260,000 t/y of slag, 160,000 t/y of ilmenite and 35,000 t/y of rutile. In Australia, the first Murray Basin project began production. Wemen owned by Murray Basin Minerals, will have a capacity of 30,000 t/y of ilmenite and 30,000 t/y of rutile. In India, V.V. Minerals began exports of ilmenite, following granting of an export licence in late 2000. Namakwa Sands, South Africa, continued to increase slag production as a second furnace was slowly commissioned. Design capacity is 235,000 t/y.

**Ilmenite Production Capacity - 1999 to 2001 by Region ('000 t/y)**

	1999	2000	2001
Australia*	2,000	2,300	2,300
India	400	400	400
Malaysia	30	30	30
Sri Lanka	80	80	80
Brazil	100	100	120
US	430	460	460
Norway **	0	300	300
W.World Total	3,000	3,700	3,700

\* Includes ilmenite used in synthetic rutile.

\*\* Slag production using Tellenes ilmenite ceased mid-97, resuming in 2000.

NB: Canadian and South African ilmenite production used in slag production omitted.

Source: SSB

Incremental expansions at established producers also contributed to increased supply.

In Canada, QIT further increased production of UGS and sulphatable slag from its operation at Sorell, Quebec. In Brazil, Millennium Chemicals increased output of ilmenite from the Mataraca operations by installing a new dredge. Incremental expansions also occurred at Consolidated Rutile, Queensland, and India Rare Earths.

**Synthetic Rutile Production Capacity - 1999 to 2001 by Region ('000 t/y)**

	1999	2000	2001
Australia	670	670	670
India	90	90	90
US	100	100	100
Other	30	30	30
W.World Total	900	900	900

Source: SSB

In Norway, Tinfos completed the reversion to production of sulphate slag, and chloride slag production ceased.

Output declined at Richards Bay Minerals. Chloride slag production was curtailed in response to market weakness. Elsewhere, production was curtailed at Tiwest and Kerr-McGee (synthetic rutile), Cable Sands and Iluka (ilmenite).

Potential increases in supply from new projects will be limited over the next few years. In 2002, additional supply will be available from Namakwa Sands and Ticor, South Africa as the projects ramp-up to full capacity. Also, Iluka plans to increase output from Old Hickory in the US and to increase synthetic rutile production in Australia.

**Titaniferous Slag Production Capacity - 1999 to 2001 by Region ('000 t/y)**

	1999	2000	2001
Canada	1,000	1,000	1,000
South Africa	1,000	1,100	1,200
Norway	150	150	150
W.World Total	2,150	2,250	2,350

Source: SSB

By 2005 there are a number of projects which could be operating, including several in the Murray Basin. Basin Minerals' Douglas, Southern Titanium's Mindarie and BeMaX's Gingko are probably the projects most likely to start first.

**Outlook**

In early 2002, titanium markets remain depressed. However, there are early indications of economic recovery in the US which, if sustained, will flow through to increased demand for titanium products.