WORLD TITANIUM SPONGE SUPPLY SITUATION

Sylvain GEHLER, UKTMP Chairman
1. Update on Titanium feedstock for sponge.

2. Short Overview of demand for Titanium sponge:
   • Demand for aerospace industry;
   • Demand for industrial market.

3. World Titanium sponge supply:
   • World Titanium sponge capacity, capacity vs production;
   • Titanium sponge inventory.
Update on Titanium sponge feedstock.

– The demand for pigment is still very strong, inventories are low and need replacement;

– Sulphate ilmenite price has increased by 40% in 2017;

– Chinese pigment producers have ramped up production, in 2016 demand for sulphate ilmenite increased by 50% compared to 2015, in 2017 compared to 2016 it increased by 15%. It is forecasted that demand will remain strong in 2018.

– The supply of chloride grade feedstock has tightened because of supply chain issues at producers in South Africa and Norway, the prices have already increased;
China Titanium Raw Materials Imports in 2015 - 2017

SULPHATE ILMENITE, MT

---|---|---|---|---|---|---|---|---|---|---|---
340,229 | 492,700 | 363,764 | 352,429 | 541,179 | 510,423 | 618,964 | 643,034 | 632,857 | 916,724 | 627,041 | 508,438

Yearly imports:
- 2015: 1,549,121
- 2016: 2,313,600
- 2017: 2,685,060

Quarterly imports:
- Q1 2017: 916,724

Source: TZMI
Aerospace

1. Demand for the aerospace industry remains very strong, the ramp up of the long range planes B787 and A350 is ongoing.

2. Single aisle planes at Boeing and Airbus are being ramped up to historical high build rate.
### Aerospace Market

#### Airbus Orders Backlog
30 April 2018

<table>
<thead>
<tr>
<th>Aircraft</th>
<th>Firm Order Backlog</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Aisle (A320, A320NEO)</td>
<td>6,109</td>
</tr>
<tr>
<td>Long Range (A330, A350XWB)</td>
<td>965</td>
</tr>
<tr>
<td>Large Aircraft (A380)</td>
<td>105</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>7,179</strong></td>
</tr>
</tbody>
</table>

Source: [www.airbus.com](http://www.airbus.com)

#### Boeing Orders Backlog
30 April 2018

<table>
<thead>
<tr>
<th>Aircraft</th>
<th>Firm Order Backlog</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boeing 737 family</td>
<td>4,673</td>
</tr>
<tr>
<td>Boeing 747-800</td>
<td>24</td>
</tr>
<tr>
<td>Boeing 767/777 family</td>
<td>520</td>
</tr>
<tr>
<td>Boeing 787 family</td>
<td>687</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>5,904</strong></td>
</tr>
</tbody>
</table>

Source: [www.boeing.com](http://www.boeing.com)

#### Single Aisle Aircraft share in the backlog

<table>
<thead>
<tr>
<th>Aircraft</th>
<th>April 2018</th>
<th>July 2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boeing (B737 family)</td>
<td>79%</td>
<td>48%</td>
</tr>
<tr>
<td>Airbus (A320 family)</td>
<td>85%</td>
<td>79%</td>
</tr>
</tbody>
</table>
Aerospace market

1. Backlog is still strong in spite of new orders decreasing, it represents 9 years of guaranteed work. The backlog is made up on 80% of single aisle at Boeing and 85% at Airbus.

2. Boeing is presently producing 14 B787 per month.

3. Airbus is ramping up the production of the A350.

4. Both Airbus and Boeing are ramping up gradually their single aisles production and both should reach 60 planes per month.
Market Update

Industrial Markets

1. Volume and pricing remain depressed but future outlook is improving.
2. Shipbuilding industry in China and Korea is picking up with already $16.8 b of orders for LNG and container ships in 2017 against $6.8 b in 2016.
3. With prices of oil and gas increasing producers are looking at investing again.
4. Demand for energy and chemical markets is still strong, especially in China.
WORLDWIDE TITANIUM SPONGE PRODUCTION
In 2018 World Titanium Sponge production will increase by 7,578 MT compared to 2017.
In 2018 CIS Titanium Sponge production will increase by 14,000 MT compared to 2017.
North America Titanium Sponge Production

- 2007: 19,900
- 2008: 22,600
- 2009: 7,500
- 2010: 8,000
- 2011: 14,000
- 2012: 18,000
- 2013: 12,530
- 2014: 18,530
- 2015: 18,500
- 2016: 10,000
- 2017: 9,000
- 2018 (estimated): 7,000

Bar chart showing production from 2007 to 2018.
US imports increased in 2017 by 7,374 MT which reflects replacement of decreased inventory.
In 2017 Chinese Titanium Sponge production increased by 5,845 MT compared to 2016.
At the end of 2017 world Titanium sponge capacity was rated at 255,300 T. Chinese sponge capacity increased from 88,000 T to 93,000 T.
Average rate of utilization of sponge capacity is 73%
US Titanium Sponge inventory
metric tons, end of year

Source: USGS

As compared to the end of 2016, at the end of 2017 US inventory decreased by 11,900 T.
Titanium Sponge Stocks

*metric tons, end of year*

Source: USGS for US inventory

At the end of 2017 total world Titanium sponge inventory was estimated at 23,200 T.
CONCLUSION

• After 4 years of low activity titanium sponge market is picking up again.

• The increase of build rates of long range aircrafts, the strong demand for engines as well as the growth of the Chinese domestic market has helped to decrease the high inventory of sponge which was overhanging in the market.

• The high inventory caused by the long delay of the expected demand of the titanium market has finally decreased to an acceptable level.

• During this long waiting period the sponge producers had to either decrease production or build up large inventory.

• Nevertheless there are still some threats to the recovery of the titanium market:
  
  ➢ The tightness of titanium feedstock could disrupt the supply of titanium sponge.
  ➢ Sponge producers have to compete with pigment producers who require about 95% of the world supply of titanium feedstock.
  ➢ Price of feedstock has already moved up and pigment producers can afford to pay higher price for their raw material because price of pigment has also increased. Sponge producers in 2018 had to face a price increase for their feedstock which they had to absorb themselves. If the price of titanium feedstock would continue to increase and the supply tighten further, sponge producers may have no other alternative but to request a price increase to their customers.
THANK YOU FOR YOUR ATTENTION!