Cleveland Research

**Highlighting the current market trends for titanium:
What are the potential areas of strength or weakness over the next year?

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Important Disclosures can be Found in Appendix
Defining Our Process

• We speak to a large number of contacts within the specialty materials industry each quarter.
  – We have been conducting our “channel work” since 2006, through web-based surveys and/or calls with distributors/buyers.
  – Our goal is to measure the relative health of certain product categories as well as end-markets -- gauging changes in industry momentum.
  – We issue a report following completion of the survey to anybody that participates in our market updates.
  – Our quarterly market review includes: aerospace materials, titanium, nickel-based alloys, aluminum, stainless, and carbon steel markets. We have a North American market focus, but have been reaching out for an increased # of global data points.
Bottom-line: The Titanium Market Is Showing Relative Strength In 2014

• We believe the global market has reached an interesting inflection point in 2H -- demand momentum has started to improve & the sentiment among our contacts is positive.

• Here are the five key points of note from our 3Q report:
  1) Customer orders have rebounded versus a fairly low rate over the last 2 years.
  2) The aerospace markets have transitioned to a demand pull on the market instead of headwind – jet engine and frame seem to be more active.
  3) The inventory situation could become the next catalyst over the next few months – both distribution and BA appear better balanced.
  4) We are seeing better mill lead times (out five weeks versus last quarter).
  5) Raw material costs are picking up. This is seen as a positive leading indicator for mill production/demand.
TOP TITANIUM MARKET INSIGHTS AND CHARTS - WHAT DID WE SEE IN 3Q?
Titanium Demand Update: Downstream Orders Have Improved Since Late 2013.

CRC Titanium Quarterly Demand Update
NT Order Growth Trends (%, y/y)

Source: CRC Survey
Titanium Demand Update: New Orders Exceeded Expectations In 3Q—For The 1st Time In 2 Years.

CRC Quarterly Specialty Material Update
Current Monthly Growth Vs. Plan (Net % Above Vs. Below)

Source: CRC Survey

% Above or Below
Titanium
Titanium Demand Update:
We Believe Most Of The 2H Orders Have Been Generated By The Aerospace Markets.

CRC Quarterly Specialty Materials Update
Aerospace Demand Growth Breakdown (% Growth Per Q)

Jet engine growth @ +7%

Source: CRC Surveys
Titanium Demand Update:
We Are Still Seeing Relative Weakness In The Military/Defense And Industrial Markets

CRC Quarterly Specialty Materials Update
2014 -- Current Demand (% Growth)

Source: CRC Survey
Titanium Demand Update: Titanium Demand Is Still Lagging In Comparison To Nickel-Alloys

CRC Nickel-Based Quarterly Demand Update
NT Order Growth Trends (% y/y)

Source: CRC Survey

Avg Comp  12-Mth Avg
Titanium Demand Update:
The Full-Year Expectations Are Moving Higher - Early Read On 2015 is +6%

Titanium Market Demand Analysis
Quarterly Survey Growth Rate (Annualized) Versus Estimated Mill Shipments

Source: Industry Sources; CRC est.
Titanium Supply Update:
Titanium Mill Lead Times Have Been Moving Out - Up 5 Weeks in 3Q (Versus 2Q)

CRC Quarterly Titanium Backlog Update
Average Mill Lead Time (In Weeks)

Source: CRC Survey
Titanium Supply Update: Service Centers & Fabricators Are Looking To Build Inventories

CRC Specialty Materials Survey Inventory Intention (Build Vs. Liquidate)

Russian Supply Uncertainty Could Be A Factor

Source: CRC Survey
Titanium Supply Update: The Boeing Inventory Situation Appears To Be Improving

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<th>Expectations For A Balanced BA Channel (% of Total Contacts) When Do You Expect Buying To Normalize?</th>
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Titanium Supply Update: We Are Looking For Operating Rate To Start Moving Higher In 2015 & 2016
**APPENDIX**

**Disclosures:** I, Chris Olin, certify that the views expressed in the research report(s) accurately reflect our personal views about the subject security(s). Further, we certify that no part of our compensation was, is, or will be directly or indirectly related to the specific recommendations or views contained in the research report(s). The analysts responsible for the preparation of this report have no ownership stake in this company. Cleveland Research Company provides no investment banking services of any type on this or any company. Proprietary research and Information contained herein which forms the basis for findings or opinions expressed by Cleveland Research Company may be used by Cleveland Research for other purposes in the course of compensated consulting and other services rendered to third parties.

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