A Conversation with Titanium Suppliers and End Users

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To gain an overview of the state of the titanium industry, JOM spoke with representatives from several companies involved in the production and use of titanium. The journal posed several parallel questions to titanium producers and titanium end users to see how their answers compared. Titanium producer ATI Allvac submitted a corporate response to the questions.

Q. Suppliers: What do you think titanium end users are looking for from you?

Oscar Yu, RTI Titanium: Low cost is the number-one factor. In the old days, it was quality. Quality is now a given. In addition, end users now want lower cost. And, of course, there’s delivery. I would say those are the three most important factors: cost, quality, and delivery.

Chris Boland, Timet: End users are principally looking for a supplier that can deliver value, meaning: consistency in producing a broad range of high-quality products; reliability in supply and delivery performance; creativity in managing the supply chain; support in the development/application of titanium for their specific needs; responsiveness and flexibility in what is a very dynamic and cyclical industry; and support on a global basis. As the dynamics of supply continue to change, there is considerable pressure on the primary mill sources to provide increased amounts of added value while supporting ever more stringent specifications.

ATI Allvac: Our answer to this question includes all titanium customers, not just end users. Our customers demand quality, defined as compliance to specifications and fitness for use, availability when needed, continuous improvement of the products’ metallurgical and physical properties, and our overall reliability as their supplier.

Q. End Users: What do you look for from a titanium supplier?

Rodney Boyer, Boeing: It must be a shop with good integrity that can demonstrate that they will consistently produce a product of aerospace quality, sometimes to special requirements, and deliver on time. I would also look for one that is always trying to improve and develop new products or processes to improve their position in the market place. It must also have good quality systems that can be approved to International Organization for Standardization and National Aerospace and Defense Contractors Accreditation Program requirements.

Naomi Murray and Mahesh Mohanty, Stryker Orthopaedics: We look to our titanium suppliers for reliability, consistency, and expediency. We expect them to conduct business consistent with established legal and ethical standards. We also expect a titanium supplier to have a fundamental understanding of titanium physical and mechanical metallurgy. In any industry, it never hurts to have a supplier that is familiar with our challenges—from the fundamental problems we’re trying to solve with our products to the technical challenges we face during our development and manufacturing of new and existing products—and who can anticipate our needs.

Andrew Sherman, Ford: We look at, obviously, a favorable price. We look for a supplier who can meet Ford’s requirements, who can demonstrate the ability to provide materials to our specifications consistently and on time, and who responds to technical services.

Q. All: In which markets is titanium likely to replace or be replaced by another material?

Naomi Murray and Mahesh Mohanty, Stryker Orthopaedics: In North America, approximately 70% of the total titanium consumed is utilized in the aerospace industry. Titanium alloys will continue to be in the forefront in applications that require reductions in weight while maintaining performance in high-temperature environments, such as aero engines. On the other hand, lightweight materials like carbon-based composites may replace titanium in components that are exposed to less aggressive conditions.

Titanium is commonly used in medical implants such as hip and knee joints, bone screws, and dental implants due to its exceptional bio compatibility. An estimated growth of 14% in the medical device industry is expected to drive growth of titanium.

Oscar Yu, RTI Titanium: Titanium is traditionally used for aerospace and corrosion resistance applications. In the aerospace industry, three major metals are used: aluminum, titanium, and superalloys. The superalloys are used in the engine, aluminum is used in the airframe, but titanium is used in both. Superalloys don’t really have to worry about competition in the engine, but aluminum is facing a lot of competition from composites. Actually, it’s good for titanium when more composites are used because then more titanium is used. That’s why the Boeing Dreamliner uses so much more titanium than other Boeing planes, because it uses composites.

Rodney Boyer, Boeing: In aerospace, the titanium industry is aided by titanium compatibility with the graphite...
Chris Boland, Timet: The development of processes and products to meet our customers’ demands is at the forefront of our R&D priorities. Cost reduction is also a major issue as global dynamics dictate the need to be as cost efficient and productive as possible. Melt and thermomechanical processing technology innovation is key to accomplishing these goals. Simultaneously, we are focusing on developing and implementing innovations in new technologies to lower the cost of producing sponge.

In specific areas, alloy development across all major sectors—aerospace, armor, automotive, chemical plant, oil, and gas—is capturing more of our resources as these needs increase, and as improving economic conditions permit. We have a number of products and process development programs targeting the civil and military aerospace, land, and sea based craft markets.

Computer-aided predictive process modeling is a key tool designed to enable us to understand and apply the most effective manufacturing tools to produce the most cost-efficient and consistent products possible to meet the demands of individual market sectors.

In collaboration with our customers, we are further developing engineered solutions to field applications through increased product differentiation.

Oscar Yu, RTI Titanium: Cost is the biggest thing. The customer doesn’t come to me and say, “I need a stronger alloy.” I don’t hear that. There are some ongoing alloy development activities but they also focus on cost reduction instead of a higher strength. So R&D efforts are focused on reducing the cost of processing. DARPA [the U.S. Department of Defense’s Defense Advanced Research Projects Agency] is investing in research to reduce the cost of titanium sponge and processing costs. However, the real cost savings comes from the flexible use of various forms of low-cost raw materials. Also, single melt produces near-net-shape ingots and slabs, which can reduce the subsequent thermomechanical processing cost. VAR processing can only produce large round ingots.