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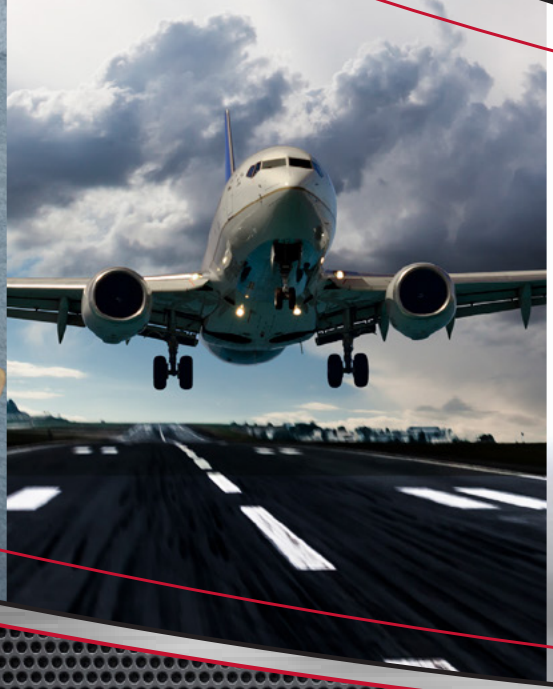

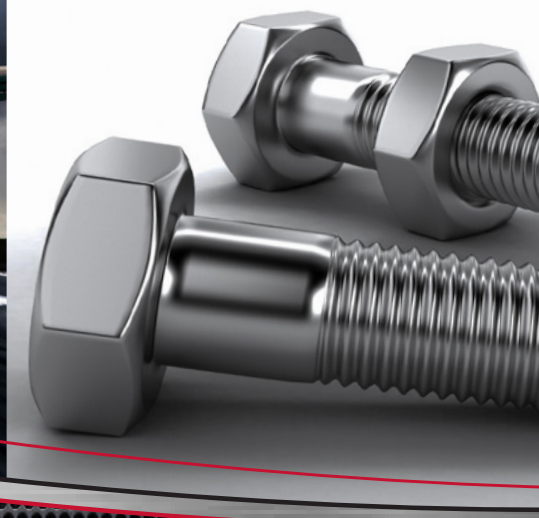

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Donald E. Larsen
Interim Plant Manager, Ti-Ingot and Director, Special Projects
Arconic Engineered Structures

Donald E. Larsen was formerly Vice President, R&D, General Manager Advanced Manufacturing for Arconic, a global technology, engineering and advanced manufacturing leader. In this role, he was responsible for leading R&D and production teams working on priority titanium technology projects, including 3D printing and advanced manufacturing activities. He also served as a liaison to the Arconic Technical Center (ATC) and Arconic's Whitehall Technology Center. Don retired Q3 of 2018, and has currently taken on the role of Interim Plant Manager Ti-Ingot Operation and Director of Special Projects.

Don joined the company in 1988 and has served in a number of roles focused on the research, development and production of titanium products. He has also held operational and sales and marketing roles with the company.

Don has a master's degree in metallurgical engineering from The Ohio State University, and is the holder of 11 U.S. patents. He has published more than 30 technical articles in the field of titanium. He is also a member of the International Titanium Foundation Board of Directors.

ITA Vice President

Michael G. Metz
President
VSMPO Tirus US

Michael Metz joined VSMPO - Tirus, US in November 2003 as Vice President, Commercial and was named President of the organization in 2007. VSMPO is the largest producer of titanium in the world, vertically integrated from titanium sponge manufacture through melting and mill products such as plate, sheet, bar, billet, wire, and welded and seamless tubing. In addition, VSMPO supplies titanium closed die forgings for airframe and engine applications. Mike has served on the International Titanium Association Board of Directors since 2007 holding the positions of Director, Vice President and President.

He has significant experience in the titanium industry, having had held positions in sales, distribution, product management, market research and forecasting at Titanium Metals Corporation from 1986 to 2003 before joining VSMPO. Mike graduated from Hamilton College in 1981 with a BA in economics, and from Carnegie – Mellon University in 1983 with an MBA.

ITA Secretary/Treasurer
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Professor Markus Holz

Dr. Markus Holz is presently an ITA Academic Member. Formerly President of AMG's Engineering Systems Division and CEO of Vacuum Technologies GmbH from 2012 to 2019. He joined the ALD Management Board in October 2011. Dr. Holz graduated in Aerospace Engineering in 1986 and earned his PhD in 1992. Following his 10 years of service in the German Airforce, Dr. Holz began his career with ThyssenKrupp in 1992, where he assumed several executive positions mainly in the stainless steel and special metals branch. In 1999, Dr. Holz became Managing Director of ThyssenKrupp Titanium GmbH (formerly Deutsche Titan GmbH) and in 2002 he was appointed Managing Director of ThyssenKrupp Titanium S.p.A. (formerly Titania S.p.A.). Furthermore, he was responsible for Tubifi cio di Terni, Italien, from 2004 through 2007. From 2007 to 2009 he was CEO of the ThyssenKrupp Titanium Group (Germany and Italy). In January 2010 he joined the Managing Board of Hempel Special Metals, Oberhausen, Germany. He is Honorary Professor at University of Applied Sciences Anhalt Teaching Operations Management.

ITA Past President

Henry S. Seiner
Vice President – Business Strategy
TIMET, Titanium Metals Corporation

Mr. Seiner, TIMET's Vice President of Business Strategy, oversees the Marketing, Product Management, Purchasing and Production Planning organizations for TIMET. In this role, he has responsibility for and visibility into all aspects of TIMET's supply chain. Henry is based in TIMET's Toronto, OH facility — which is geographically and structurally in the middle of TIMET's global supply chain. He has held various positions in Production Planning, Manufacturing, Purchasing and Marketing in his 25 year tenure at TIMET.

Prior to coming to TIMET, Henry spent six years at U. S. Steel Corporation in Sales, Marketing and Production Planning. His educational background includes a Masters Degree from Carnegie Mellon University in Pittsburgh, PA and a Bachelor's Degree from Duke University in Durham, NC. Henry is a native of Pittsburgh and continues to reside in Western Pennsylvania.

Albert Bruneau
President
Neotiss High Performance Tube
ITA Director

Neotiss High Performance Tube (formerly Vallourec) headquartered in France, is the worldwide leader of titanium and stainless steel welded tubes for heat exchangers, with facilities and sales forces based in five countries on three continents: France, United States, China, India and Korea.

Prior to Vallourec Heat Exchanger Tubes, Albert Bruneau has held numerous senior sales & marketing management positions within Vallourec group mainly for the Oil & Gas industry, involved in Europe, South America, Africa and Middle East.

Albert Bruneau graduated from French Engineering School ESPCI and conducted one Executive MBA at the French Business School HEC.

Brian J. Malloy
Vice President and Chief Commercial Officer
Carpenter Technology Corporation
ITA Director
ITA Powder Committee Chair

Brian J. Malloy was named Vice President and Chief Commerical officer of Carpenter Technology Corporation in March 2016. Brian is responsible for overseeing all of the company's commericial operations which account for $2.2 billion in total annual net sales. This includes marketing, sales and customer service for both the Specialty Alloys Operations (SAO) and Peformance Engineered Products (PEP) business segments. Brian joined Carpenter in August 2015 as Vice President, Sales & Customer Service for the SAO segment, which accounts for nearly 80 percent of Carpenter's total annual net sales.

Edward J. Newman
Senior Vice President
United Alloys & Metals, Inc.
ITA Director

Edward Newman is the current Senior Vice President at United Alloys & Metals, Inc., a subsidiary of Cronimet USA. Mr. Newman has been involved in the titanium recycling industry for the past forty years. He previously held various positions related to the purchasing, processing, and marketing or titanium and high temperature alloy scrap. He has spoken at various metals conferences on subjects related to the recycling of titanium and various other aerospace metals. He holds a Bachelor of Science degree in Business Administration.

Mr. Newman is a current member of the International Titanium Association's Board of Directors.

Brett Paddock
President and Chief Executive Officer
T.I. (Titanium Industries, Inc.)
ITA Director
ITA Nominating Committee Chair

Brett is the President and CEO of Titanium Industries, Inc. His diverse metals background consists of engineering consulting, fabrication, manufacturing, contracting, and sales. He has held positions of VP of Sales and Marketing, Director of Operations, and COO during his career with Titanium Industries. Prior to joining Titanium Industries, Inc. in 2001, he was Director of Operations for one of the nation's largest structural steel fabricator/erectors and Principal of an Eastern US engineering design and consulting firm. He holds a bachelor's of science degree in engineering and a master's of science degree in structural mechanics from Lehigh University and is a licensed professional engineer in multiple states. Brett is currently serving as an Officer on the International Titanium Association's Board of Directors. Brett enjoys many outdoor sports including skiing, swimming and running as well as leisure time boating across the East Coast of the U.S.

Frank L. Perryman
President and Chief Executive Officer
Perryman Company
ITA Director

Mr. Perryman graduated from Millikin University in 1986 with a Bachelor of Science in Industrial Engineering. In 1988 he co-founded Perryman Company with his father and brother. Since December of 2008 he has held the position of President and CEO of Perryman Company. Perryman Company is a fully integrated supplier of specialty titanium products. From melting through finishing, Perryman produces titanium bar, coil, fine wire, net shapes, and hot rolled products for the aerospace, medical, consumer, industrial and recreation markets worldwide. Through its Forging and Fabrication Group the company also offers forging of titanium and other metals and fabrication of titanium, plastics, and other metals. Perryman Company is headquartered in Houston, Pennsylvania. Company offices are located in Philadelphia, Warsaw, IN, Los Angeles, London, Zurich, Tokyo and Xi'an.

Board of Directors *(cont.)*

Martin Pike
Vice President - Commercial
ATI Specialty Materials

ITA Director

Martin Pike is the Vice President - Commercial for ATI Specialty Materials with responsibilities which include international product management, sales, and long-term agreements with customers. Martin joined ATI in August 2001 and held several positions with increasing responsibility including Titanium Rolled Products, Product Manager and Director of Sales. Prior to joining ATI, Martin worked in manufacturing where he held various commercial positions including Regional Vice-President of Sales. His educational background includes a Bachelor's Degree from the University of North Carolina at Charlotte.

Michael Stitzlein
President
Tricor Metals

ITA Director

Mr. Stitzlein is President of Tricor Metals, a supplier of titanium mill products, forgings and fabrication of ASME-code equipment for the petrochemical, pharmaceutical, mining, aerospace, and biomedical markets.

Tricor is based in Wooster, Ohio, and has operations in Texas, California and Michigan. Stitzlein is a 1973 graduate of The Ohio State University. He earned an MBA at Ashland University, Ashland, OH, in 1989, and one year later purchased Tricor Industrial. The company has a headcount of more than 150 employees and stocks over 1 million pounds of inventory.

Graham P. Walker
Business Consultant
Ametek Specialty Metal Products

ITA Director
Education Committee Co-Chair

Graham P. Walker is currently Vice President, Sales and Marketing at AMETEK Specialty Metal Products. He is a qualified Metallurgist with a BSc from the University of Leeds (UK) and a MBA from Baldwin-Wallace College (OH).

Prior to joining Reading Alloys, he spent over twenty years in a variety of roles within the Foseco Group, specializing in product development and technical sales to the foundry and aluminum industries. His life and career include extensive foreign work and travel that provide a valuable international perspective.

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A Click on this YouTube video to view the latest video from the ITA Medical Technology Committee in our digital edition.

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B Titanium is thus widely used for implants, surgical devices and pacemaker cases. Its use for hip replacements and other joints, has been well established for some 40 years. Titanium not only fosters Osseointegration (joins with bones & tissues), it is non-magnetic and non-radio opaque. Titanium instruments are used for micro-surgical operations and in military light weight field trauma relief kits.

Some prostheses are engineered with roughened surfaces or porous coatings (such as hydroxy-apaptite) which hasten the bonding of titanium with adjacent hone. Surface treatment, including shot peening, nitriding and diamond like coatings may be used to provide enhanced wear resistance.

The photo on the cover is a Titanium prostheses used to replace facial bone and cartilage.

Photo by Bob Collier/Sygma/Sygma via Getty Images.

C Since teeth are mineralized tissue similar to joints and bone, titanium can be used to replace lost tooth structure since bone will anchor it in place. Essentially, a dental implant will serve as a lost tooth's new root system and osseointegration will lead to the implant becoming stabilized and supported by bone tissue. Osseointegration is a biological process where mineralized tissue like bone fuses to titanium prosthetics. The cover photo is a dental implant bridge made of Titanium. Photo provided by Rodolfo Parulan Jr. via Getty Images.

D Cover shows a technical designer with a cranial model and titanium implants in front of a monitor with the illustrations of the model fitting to the patient. Photo by Ulrich Baumgarten via Getty Images.

E Titanium is one member of a family of metals (that includes niobium and tantalum) that color anodizes because it is "reactive", i.e. it reacts when excited by heat or electricity in an electrolyte by creating a thin oxide layer at the surface. The oxide layer presents itself in color due to an interference phenomenon. This layer is a very thin, transparent coating that derives its 'color' when white light reflects off the base metallic surface, only to be "interfered with" within the coating. Some frequencies of light waves escape and recombine with surface light to be either reinforced or cancelled out—producing the color we see.

Anodized coatings can be applied to titanium for a number of reasons: General color-coding, Product/part identification, Material Identification, Size identification, Corporate color matching, Product appeal enhancement, Aesthetics, and Enhanced properties.

Products for which titanium anodization is applicable range from orthopedic and dental implants, to undersea mateable connectors, to aerospace components. Within the orthopedic industry, products for which this type of treatment is often applied include bone plates and screws, intramedullary nails and rods, spine "cages," and other hardware commonly associated with trauma or spinal surgery.

The anodized dental implants shown on the cover were provided by danielzgombic via Getty Images.

Arman Sadeghi, 'Mr. Titanium', Overcomes Injuries To Share an Inspirational Message of Love, Gratitude

Arman Sadeghi has a story to tell. In fact, it's an inspirational story that he feels compelled to share with others, especially people going through tragic, turbulent times. It's a story that, quite literally, uses titanium as a metaphor (and a material) for inner strength, inspiration and healing. But it's a story that goes far beyond a medical case history.

Sadeghi's story begins with a carefree, joyful celebration with his wife and friends on the night of New Year's Eve 2013. Suddenly, everything went black, and Sadeghi woke up to find himself strapped to a hospital bed. At first he thought it was a nightmare, but then, fighting through his initial disorientation, he soon understood it was a real situation and that he had suffered traumatic injuries.

Prior to this catastrophic event, Sadeghi had been leading a successful, some might say charmed and unconventional life—a biography that could be the stuff of a Hollywood movie script. Growing up in southern California, he was a young man who demonstrated a superior level of high-speed energy, drive and intelligence. He had embarked on a path to become a business entrepreneur, dropping out of high school in the early 1990s to launch a computer business. After several years, he decided to attend the University of California, Berkeley to study molecular and cell biology and neurobiology. He then was accepted into Harvard Medical School, but left after two years. He decided it was time for him to go back into the business world and begin applying the

academic knowledge he had absorbed.

"I love business," he said during a recent interview. "I love forming partnerships with other companies, and I love to motivate young people."

In rapid-fire succession, he utilized his entrepreneurial skills to establish 12 ventures such as a global electronics recycling business, a video production studio, a restaurant, a marketing firm, a computer company and an executive coaching enterprise, which he eventually named "Titanium Success." Among his many skills, metallurgist doesn't appear on Sadeghi's resume. Like many consumers, he had only a general knowledge of titanium as a high-end industrial metal. He also appreciated how the image of titanium reflects a concept of quality, strength and durability.

Given his concern for environmental causes and his experience in high-tech business circles, Sadeghi combined these interests to establish All Green Electronics Recycling (website: www.allgreenrecycling.com), based in Tustin, CA, He serves as the chief executive of the company, which has a headcount of 125 employees. As explained on the company website, All Green Electronics Recycling's business model involves a flexible approach to recycling computers, servers, printers, telecom equipment, cell phones and televisions. The equipment is "sorted, tagged and tracked using proprietary software called Green Pulse."

Establishing this business was a great source of pride for Sadeghi and he enthusiastically poured his energy into it. However, five years ago the electronics recycling business—perhaps the most ambitious venture in his stable of companies—began to struggle. At first the revenues became unusually sluggish and uneven, but Sadeghi soon learned that there were many things going wrong below the surface. In particular, he said there were major problems with less-than-honorable employees who had betrayed his trust. It resulted in serious financial struggles that threatened the viability of the company.

Without revealing details or disclosing names, Sadeghi acknowledged that all of this upheaval was a major setback for him—professionally and personally. "I was in a very dark place," he confessed. The business stress was compounded by family pressure; he and his wife Sidney had a "blessed event:" the birth of the first of the couple's two daughters.

As he began to grapple with various dilemmas to save his company, he heard a catchy tune on the radio that would become his salvation. The song was "Titanium," written by Sia, David Guetta, Giorgio Tuinfort and Afrojack and released in 2011. The composition, a musical poem about inner strength, features a modern pop beat and guitar riff.

You shout it out,
But I can't hear a word you say
I'm talking loud, not saying much
I'm criticized but all your bullets ricochet
You shoot me down, but I get up

I'm bulletproof, nothing to lose
Fire away, fire away
Ricochet, you take your aim
Fire away, fire away
You shoot me down but I won't fall
I am titanium
You shoot me down but I won't fall
I am titanium

"This was a difficult time, but the song Titanium became my anthem," Sadeghi recalled. "In fact, I think that song might have saved my life. It kept reminding me how important it is to be strong, especially when you're facing problems and challenges in life."

Admitting to being mildly obsessive, Titanium not only became his favorite song; it was his only song. He listened to it in his car, on his cellphone, in his headphones during workouts at this health club, and on his home stereo. Sadeghi said his wife quipped that she really liked the song "the first 500 times he played it." She also teased him in a humorous manner and began to call him "Mr. Titanium." Sadeghi not only played along with the joke, he wore his new title as a badge of honor. "Yes, I'm Mr. Titanium," he would tell his friends. "People wanted to know how I was dealing with my business problems. I told them that I was made of titanium."

Eventually, he began to rectify the many issues at his recycling company. Business began to improve. Things were looking up for Mr. Titanium as the song continued to provide him with a soundtrack for inspiration. He had found a path out of his "dark place."

And then came New Year's Eve 2013.

When he opened his eyes at Hoag Hospital in Orange County, CA, on New Year's Day, 2014, Sadeghi quickly realized he was connected to a plethora of tubes and electronic monitoring devices. His first thought was of his wife, Sidney; what had happened to her? Were they in some sort of accident together? Did she get hurt as well?

A doctor entered the intensive-care room and began to explain the circumstances to Sadeghi. His wife and friends were fine. However, at some point during the New Year's Eve celebration, in front of the Sutra Lounge in Costa Mesa, CA, out of the blue and without warning, Sadeghi was attacked by a gang of men and beaten. He had no memory of the cruel, criminal act, but was told that his wife and friends had found him unconscious, laying in a pool of blood outside of Triangle Square, and was rushed to the hospital.

Among his many serious injuries, the orbital bone of his left eye was completely shattered, along with his cheek bone and multiple other bones on the left side of his face, apparently from repeated kicks to his head while he lay unconscious on the sidewalk.

The medical staff began to assist Sadeghi and provide him with treatment. He then was introduced to a renowned plastic surgeon affectionately known as "Dr. Go" (Parviz H. Goshtasby, M.D.), who is based in Newport Beach, CA. According to his online biography, Dr. Goshtasby has achieved double board-certification by the American Board of Surgery and the American Board of Plastic Surgery and has attained additional certification (C.A.Q.) in the Subspecialty of Surgery of the Hand, making him one of only a handful of surgeons to achieve triple certification in general surgery, plastic and reconstructive surgery, and hand surgery. He was selected as a Fellow of the American College of Surgeons (FACS), an honor bestowed upon select surgeons only after critical peer review and analysis of their clinical practice and surgical skills. In addition, Dr. Goshtasby is an active member of the American Society of Plastic Surgeons (ASPS), the Orange County Society of Plastic Surgeons (OCSPS), the American College of Surgeons (ACS), and the American Medical Association (AMA).

Dr. Go had a consultation with Sadeghi and described how he would repair his facial trauma. He would be able to work from the inside of his mouth and inside of his lower eyelid so that there would be no visible scars. Finally, after reviewing the procedures and his course of action, he mentioned to Sadeghi that he would be using multiple titanium plates to fix his cheek bone and a titanium mesh to rebuild his eye socket.

Sadeghi paused for a moment and then began to smile. "Titanium?" he said. "You're going to use titanium? Will I get to keep the titanium?" Somewhat perplexed, Dr. Go assured Sadeghi that the implants were permanent, but there was nothing to fear.

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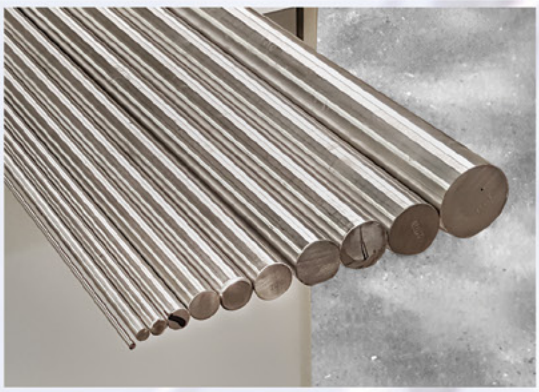

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"No, you don't understand," Sadeghi said. "This is the coolest thing ever." Sidney then tried to explain about how she called her husband "Mr. Titanium" and how he was inspired by the pop song. "Dr. Go must have thought we were crazy," Sadeghi said.

Dr. Go operated on Mr. Titanium and rebuilt his damaged face, using medical-grade titanium implants. "He put me back together," Sadeghi declared, expressing his gratitude. In his recovery aftermath, he said he still deals with some pain and numbness due to nerve damage. But Sadeghi is also quite tickled that titanium, quite literally, is now part of who he is. "I can actually feel the titanium in my face with my fingers," he said. "It's incredible. Today, I really get to be Mr. Titanium."

Having survived such a horrific episode in his life, and feeling thankful for the support of his family, friends and the medical professionals who helped to heal him, Sadeghi now confronted serious existential questions: Where would he go from here? What would he do with the rest of his life? How would he channel his multi-tasking energies and business skills?

He had reached a moment when it was time to re-examine his priorities and convictions. "There came a point where I made a deal with God," he confessed. "I decided to commit myself to serving other people. I've always been involved in business coaching and counseling others. I decided to focus on those skills."

Using his entrepreneurial capabilities, Sadeghi developed the "Titanium Success Method" (website: https://titaniumsuccess.com) and launched his "Titanium Live" seminars. The slogan for the method is: "Success Down to a Science: Health, Wealth, Business, and Relationships." According to the biography posted on this website, Sadeghi "gained the knowledge and the passion for healthy mind, body, and spirit, driving his love for coaching through Titanium Success, and his personal life as a devoted and present husband and father. My objective is to help clients take their lives to a new level by addressing certain aspects of their life, including physical health, family, intimate relationships, spiritual health and finances."

The "Titanium" approach, he explained, "is more than a motivational practice; it's a resilient lifestyle. Titanium's pragmatic approach uses the basic elements of neuro-linguistic programming (sight, sound and emotions) and teaches students how to use these skills to make positive life choices." In his program, he said he works "with men and women who have had successful careers but lack fulfillment in their lives, or feel content but have fears that prevent them from moving their lives to the next level. Gratitude and prayer are an important part of Titanium's principles."

"It's all about learning how to live life to the fullest and living to give to others," he stated, noting that the Titanium Success Method encompasses personal fitness, health and proper nutrition, and promoting a discipline of business management methods. Sadeghi immediately realized he would need to master the knowledge and science behind his success method along with his teaching skills, which would enable others to implement the wisdom. As such, he emphasized that his program and the methods used to teach it are grounded in the neuro-science he learned as a university student, as well as his own experiences. "I tried to take the things I already was doing as an executive coach and then figure out the science behind it. I used neuro-science to understand how people think and how to create effective communication tools."

The Titanium Success Method also incorporates training he received from his own mentors; teachers, authors and self-help gurus like Anthony Robbins and Richard Bandler. Bandler, according to his online biography, is the co-creator of neuro-linguistic programming, defined as "a methodology to understand and change human behavior patterns."

As part of his outreach to share the principles of his Titanium Success Method, Sadeghi said he spends a considerable amount of time speaking with "folks who are dealing with great struggles in their lives. I've done speaking engagements for the United State Marine Corps as well as groups of people who've had tremendous losses in their lives, such as mothers who've lost a child. I'm especially proud of working with the Marines because I have a special bond with those who serve our nation. I love working with them, especially those Marines who have come back from battle with PTSD (post-traumatic stress disorder) and other serious conditions."

These days, life is good for Sadeghi. He is dedicated to being a good husband and father. He enjoys the dynamics of his seminars and interacting with business leaders. He is thankful for his rebuilt health and his many opportunities. And yes, he fully appreciates the fact that, after all he's learned and experienced, he is happy to wear the title of "Mr. Titanium." ■

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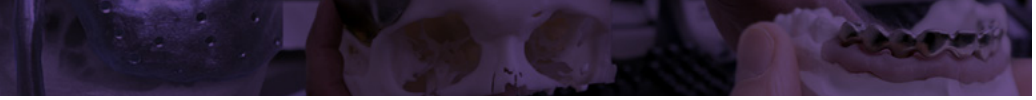

Edge, as a distributor, focuses on the needs of contract manufacturers and OEM vendors "that require material on a short lead-time basis," Smith explained. Longer mill lead times and larger mill minimum quantities are generally not conducive for contract manufacturers.

Ongoing Education Essential as Titanium Industry Continues to Gain Ground in Medical Applications

As the chair of the International Titanium Association's (ITA) Medical Technology Committee, Stephen R. Smith feels that one of his primary responsibilities is to help educate members of the titanium industry on business opportunities in the fast-growing medical business sector. Smith, who serves as the president of Edge International, a specialty metals service center and distributor based in Dayton, OH, provides materials and value-added services for contract manufacturers, many of whom work as vendors for medical original equipment manufacturers (OEMs) that produce medical implants, devices and instruments.

"Our committee looks to educate ITA members on the use of titanium in the medical market," Smith said. "We are developing market-specific sessions at the annual ITA conferences. We work with universities and researchers in the medical field. We attend conferences and trade shows to gather material that might expand industry knowledge for ITA members. We also look to educate OEMs, engineers and research and development people on the benefits of using titanium in medical applications."

Orthoworld Inc.'s 2018 executive summary provides an extensive overview of the orthopaedic industry. Founded in 1992 and headquartered in Chagrin Falls, OH,

Stephen R. Smith
President – Edge Intl/Supra Alloys
2019 ITA Medical Technology Chair

Orthoworld produces publications, organizes business conferences and disseminates various reports and studies. As such, it provides reliable information to track trends and business conditions in the worldwide orthopaedic sector. According to the 2018 executive summary, orthopaedic product sales in 2017 generated $49.3 billion—a global market that includes implants and devices for joint reconstruction (knee, hip and extremities), the spine, and trauma. Joint reconstruction accounted for 37 percent of the 2017 orthopaedic product sales market, followed by spine (18 percent) and trauma (14 percent).

The United States represents 61 percent of the overall global market, compared with 25 percent for Europe, the Middle East and Africa, and 9 percent for Asia/Pacific. The 2017 product sales total represented a 3.7

Exhibit 1
Product Segment Performance: 2017 vs. 2016 ($Millions)

	2017	*2016*	*$ Change*	*% Change*
Joint Reconstruction	$18,119.0	$17,558.7	$560.3	3.2%
Knee	$8,783.3	$8,533.8	$249.5	2.9%
Hip	$7,225.7	$7,071.5	$154.2	2.2%
Extremities	$2,110.0	$1,953.4	$156.6	8.0%
Spine	$9,080.9	$8,883.7	$197.2	2.2%
Trauma	$6,920.0	$6,614.8	$305.2	4.6%
Arthroscopy/Soft Tissue	$5,318.5	$5,009.7	$308.8	6.2%
Orthobiologics	$5,097.1	$4,946.2	$150.9	3.1%
Other*	$4,833.3	$4,572.8	$260.5	5.7%
Total	***$49,368.8***	***$47,585.9***	***$1,782.9***	***3.7%***

Credit: THE ORTHOPAEDIC INDUSTRY ANNUAL REPORT - Executive Summary 2018

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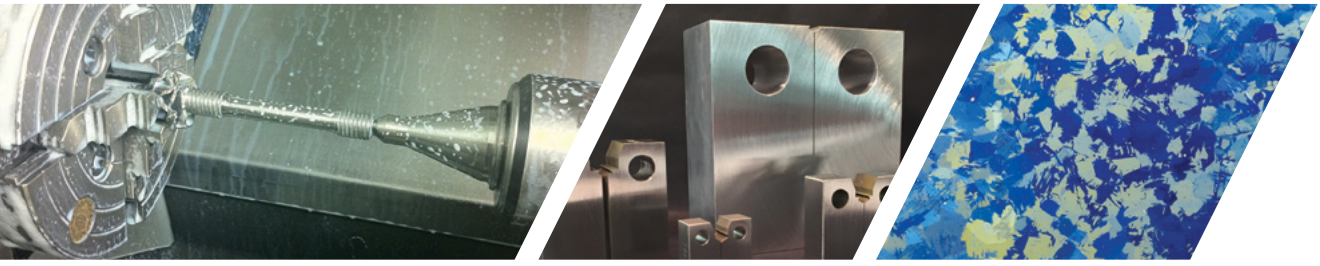

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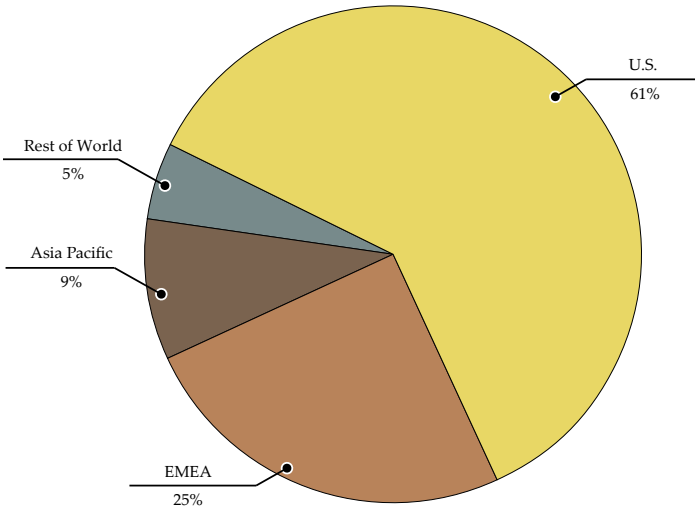
percent increase compared with the previous year. The "top-tier players," ranked by 2017 orthopaedic sales, are DePuySynthes, ZimmerBiomet, Stryker, Smith and Nephew, Medtronic, Arthrex and NuVasive. Regarding orthopaedic product sales projections to the year 2022, Orthoworld estimates that the global market will reach $53.1 billion in 2019, and will register $59.6 billion by 2022.

"Orthopaedics remains a growing market due to demographics alone," Orthoworld stated in its 2018 summary. "As the population ages, patients will seek—and public and private payors will reimburse—musculoskeletal care in order to remain active, productive members of society. We feel it's important to emphasize that the pressure surrounding price and value will persist and will compel device companies—and their supplier partners—to remain fiercely attentive to their customers' voices in order to maintain their competitiveness and margins. Additionally, as device companies consider future moves such as acquisitions and expansion of technology and markets, we expect that they will position themselves to be attractive partners to the numerous players entering the healthcare space. When under threat, the wagons circle. In this scenario, companies are joining forces and will continue to do so for the foreseeable future."

Exhibit 12
2017 Geographic Sales: Total Orthopaedic Industry



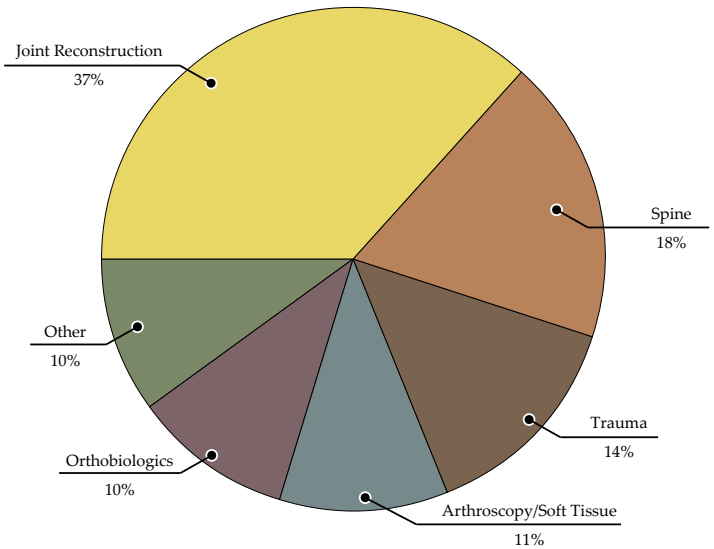
Credit: THE ORTHOPAEDIC INDUSTRY ANNUAL REPORT - Executive Summary 2018

As for the "pressure surrounding price and value" persisting in the orthopaedic market, the 2018 summary provided an observation that holds particular interest for the titanium industry. "Supplier and service providers at the far end of the supply chain provide a critical role of support as device companies seek to outsource a greater portion of the commercialization process while they concurrently decrease their number of vendors. All companies must have a strong understanding of the drivers fueling their customers' purchasing decisions." In essence, titanium industry stakeholders looking to compete in this market and become a value-added link in the global supply chain must be vigilant and knowledgeable on the business dynamics of the orthopaedic market.

How do the global sales figures translate to annual titanium shipments? Smith gave an informed estimate, saying that titanium demand for the worldwide orthopaedic market exceeded 5 million pounds for "head to toe" biomedical implants such as internal fixation (bone plates, screws and pins), prosthetics, extremity and joint replacements (hips and knees), dental implants, inner body devices, as well as surgical instruments.

"The future for medical grade titanium looks bright," Smith said during his presentation at the ITA's recent conference and exhibition.

Exhibit 2
2017 Orthopaedic Product Sales by Market Segment



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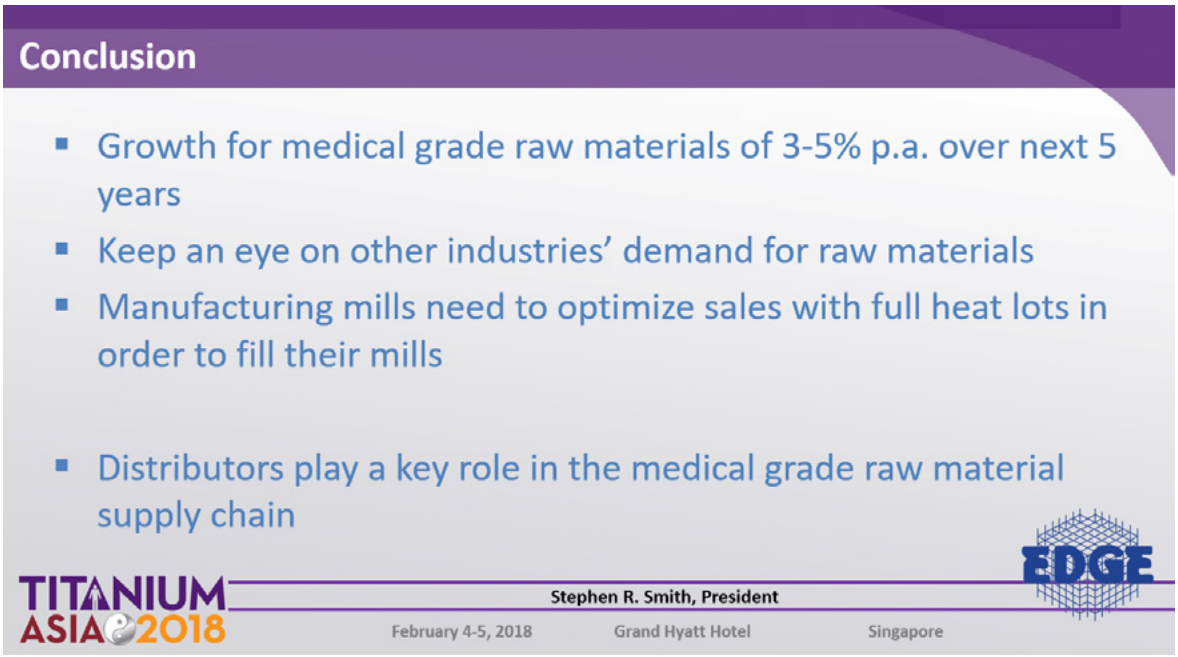

Credit: TITANIUM ASIA 2018 Conference Proceedings, ISBN #0-935297-64-2

"The aging baby boomer demographic wants to continue to stay active. The health industry is pushing all ages to lead more active lives. Growth for medical grade raw materials is projected to be three to five percent per annum over next five years. Medical industry will continue researching new and innovative uses for titanium. Distributors play a key role in the medical-grade titanium supply chain."

Edge, as a distributor, focuses on the needs of contract manufacturers and OEM vendors "that require material on a short lead-time basis," Smith explained. Longer mill lead times and larger mill minimum quantities generally are not conducive for contract manufacturers. He said Edge typically interacts with the procurement team or representative of a contract manufacturer to select a specific grade of material—titanium or another metal. Most often, Edge provides bar stock, sheet and plate.

In his presentation at TITANIUM ASIA 2018, Smith concurred with the Orthoworld observation on distributors providing medical-grade titanium. "Distributors play a key role in the medical grade raw material supply chain," Smith declared. He noted that distributors provide value-added services such as just-in-time delivery to manage inventory costs, precision grinding and sawing, prototyping, and supplying non-standard grades of material." Smith also urged OEMs to "work with a distributor on blanket orders whenever possible. This commitment enables the distributor to negotiate long-term price agreements and raw material hedge contracts with the mills, thereby enabling the distributor to offer firm pricing, with material always available on the shelf, for delivery as you need it to meet your production schedule."

Along with titanium-based biomaterials (commercial pure titanium and alloy grades such as Ti6Al-4V), the industry uses a range of medical grade raw materials including cobalt-based biomaterials (CoCrMo; L605); plastics (ultra-high molecular weight polyethylene, polyether ether ketone) specialty metallic biomaterials (ceramics); and steel (Stainless 316L; 455; 17-4PH). This portfolio of choices, by way of extension, illustrates the competition faced by titanium as a "material of choice" for medical implant applications.

"Where Ti-6Al-4V has been used, the low concentration of titanium, vanadium and aluminum in body fluids from patients with heavy wear on the prosthesis demonstrates the low dissolution rate of the wear particles. Titanium is thus widely used for implants, surgical devices and pacemaker cases. Its use for hip replacements and other joints has been well established for some 40 years. Titanium not only fosters osseointegration (the biocompatibility to join with bones & tissues), it is non-magnetic and non-radio opaque. Titanium instruments are used for micro-surgical operations and in military light weight field

(continued on page 29)

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trauma relief kits. Some prostheses are engineered with roughened surfaces or porous coatings (such as hydroxyapatite) which hasten the bonding of titanium with adjacent hone. Surface treatment, including shot peening, nitriding and diamond like coatings may be used to provide enhanced wear resistance."

Commercially Pure titanium along with Ti-6Al-4VELI and Ti-6Al-7Nb (367) continue to be the most frequently specified materials for prosthetic use. Earlier concerns about release of vanadium and/or aluminum from alloys have been largely resolved. Commercially Pure titanium and most titanium alloys are effectively nickel free and will not cause nickel dermatitis.

Additive manufacturing remains a wild card and a hot-button area of interest throughout the titanium industry, especially when it comes to producing aerospace components. The enthusiasm extends to the potential use of additive manufacturing for developing "customized" medical implants. As reported last year, the ITA's Medical Technology Committee has recognized this interest and revised its strategic plan for assessing business in the global medical market, with a focus on additive manufacturing as well as underlining the importance of distributors as the key players in the supply chain.

Medical applications for titanium, most notably in the field of joint replacements, bone reinforcements and dental devices, have gained momentum and made steady, sure progress in recent years. Smith, along with fellow committee member Viv Helwig, the founder and president of Vested Metals Inc., said that, while recognizing this progress, they see the committee's updated strategic plan as a way to re-evaluate the medical field as an emerging growth market for the titanium industry. The thrust behind this fresh perspective is to explore additive manufacturing as a means to develop customized implants when and where they're needed.

In addition to Helwig and Smith, members of the ITA committee include Eric Baum, Laboratory Testing Inc., Alex Fadick, VSMPO-Tirus US, Bob Fletcher, Structure Medical LLC, Colin McCracken, Oerlikon Metco (Canada) Inc., Ric Snyder, Fort Wayne Metals, and Tom Zuccarini, Carpenter Dynamet.

Helwig, interviewed in 2018, explained that the committee is exploring additive manufacturing technology as a technology that can enable the use of new alloys and smaller material lots to target the needs of specific medical applications, such as implants that enable greater osseointegration and bio-compatibility. Distributors seek to add value for customers by providing specific alloy grades and servicing the subcontract manufacturers, Helwig said. As always, the challenge for titanium distributors is to deliver consistent material in the supply chain, with the realization that the titanium industry and its primarily markets can be cyclical in nature with long lead times and occasional supply constraints.

According to information posted on its website (http://www.edgeintl.com), Edge International is a division of Titan Metal Fabricators, Inc. Edge is a stocking distributor of medical grade raw materials for the manufacture of implants and instruments used in the orthopaedic, spine and trauma sectors of the medical device industry. Titan Metal Fabricators, headquartered in Camarillo, CA, a reactive metal design, fabrication and metals distribution organization, acquired the assets of the metals division of Edge International in April 2017.

Founded in 2014, Vested Metals (www.vestedmetals.net), based in St. Augustine, FL, is a "solution-based" metal supplier that specializes in providing "hard-to-find grades, alloys, sizes, and overall raw material metals requirements" for the medical, aerospace, industrial markets and other business sectors. ■

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New Alloys, New Manufacturing Technologies Push Developments in Global Medical Market

Companies such as Fort Wayne Metals, Arthrex, QuesTek Innovations and others continue to explore new materials and manufacturing technologies to create titanium implants and instruments for the global medical business market. Additive manufacturing remains high on the list development areas. Companies also are creating new titanium alloys with enhanced properties and advanced design methods. Medical applications for titanium were highlighted at recent TITANIUM conferences hosted by the International Titanium Association.

Ric Snyder, Fort Wayne Metals product manager, said his colleagues in the company's research and development division, Jeremy Schaffer and Song Cai, are developing a "super elastic" titanium beta alloy for medical device applications. Though he declined to provide technical details, he said the alloy is being used to develop a product in conjunction with a medical device company. According to Snyder, the primary objective of the titanium beta alloy is to achieve the benefits of super elastic properties in materials such as Nitinol, without the high nickel content, as some patients experience allergic reactions to implants containing nickel.

Snyder pointed out that, based on this product development, he didn't want to create the impression that there are inherent problems with Nitinol used in medical products. He said it is a suitable material choice for many patients. In fact, during a presentation Miami, FL, a Fort Wayne Metals representative shared information on Nitinol shape memory alloys. Nitinol is a binary alloy comprised of approximately equal parts nickel and titanium with superior mechanical properties. The company representative said Nitinol is used in medical devices such as orthopedic implants, orthodontics, and cardiovascular stents.

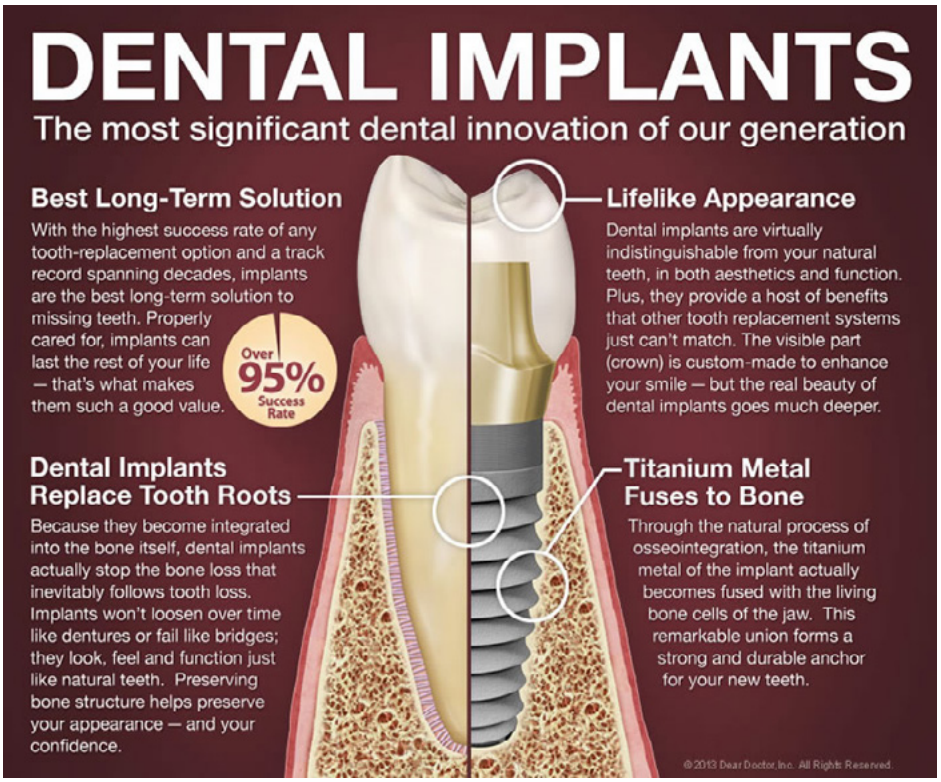
The addition of niobium and hafnium as alloying elements helps to stabilize the titanium beta structure. He said the company is developing a family of titanium beta alloys with a range of ductility and elastic properties. Medical applications include bone staples, orthopedic implants and spinal devices. "Many medical devices use wire as a foundation element," he said. Fort Wayne Metals specializes in the production of medical-grade wire made from titanium and other metals.

Another medical product offered by Fort Wayne Metals is "4TiTUDE™, which combines benefits of commercially pure titanium with the strength of Ti 6Al-4V ELI (extra low interstitials) for implant designs. According to information posted on the company website (www.fwmetals.com), 4TiTUDE™ offers a minimum tensile strength of 1,172 Mpa (170 ksi) in diameters up to 4 mm and 1,103 Mpa (160 ksi) in diameters from 4-6 mm, which is similar in strength to cold-worked alloyed Titanium. It promotes osseointegration and is compatible with osseointegrative coatings such as hydroxyapatite or calcium phosphate.

Dean Hutchinson, product manager for the Arthrex Shoulder Arthroplasty Team, said his role is to work with surgeons and engineers to develop implants. "I have experience on the manufacturing side, and we touch every aspect of the product." He said additive manufacturing is a technology that's being adopted for titanium implants, as the process is being validated by many large contract manufacturers. Additive manufacturing could help usher in the era of tailored, "patient-specific' implants. Additive manufacturing of plastics and metals is also being used to produce surgical instruments, but so far, its use is not widespread in orthopedics.

The Arthrex Shoulder Arthroplasty (surgical joint replacement) team is focused on techniques to enhance the osseointegration (bone growth) properties of titanium implants. Serving as a speaker at the Miami symposium,

Credits: Fort Wayne Metals Research Products Corp 4TiTUDE™ provides an ideal way to combine the beneficial properties of commercially pure titanium with the strength of alloyed Titanium. A possible benefit of this would be the ability to design smaller implants without sacrificing strength.



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Hutchinson explained that "titanium is perfectly matched for implantation to bone." He said the use of grit blasting, calcium phosphate, hydroxyapatite, and plasma spray coatings all help enhance bony fixation. In recent years, additive manufacturing can be programed to "design in" bony growth features for titanium implants.

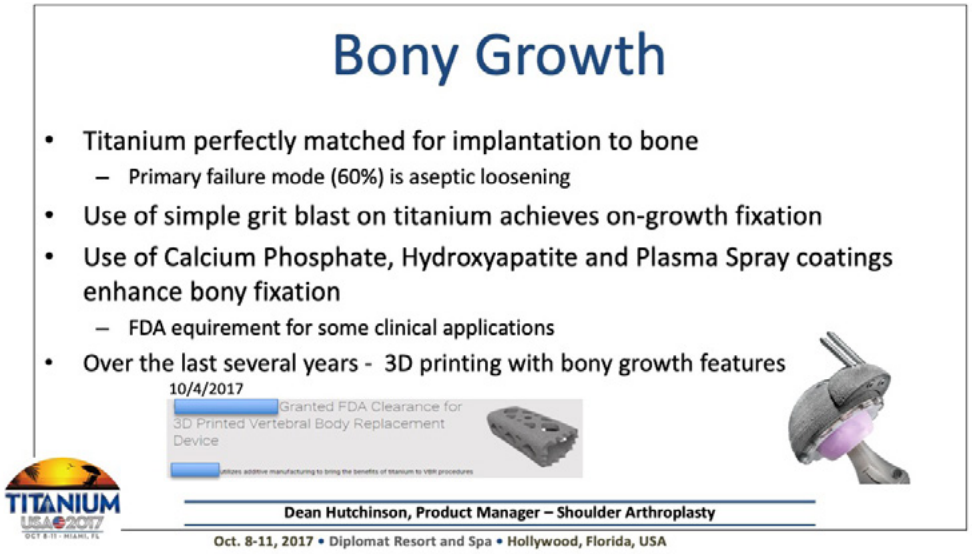
He said Arthrex is committed to the advancement of shoulder arthroplasty through technique and product innovation and has developed a comprehensive line of products to address the challenges of shoulder arthroplasty, such as the Univers Apex, VaultLock Glenoid, Universal Glenoid, Univers Revers, Univers Revers Modular Glenoid System, and novel rotator cuff repair techniques used in shoulder replacement procedures. "There are several opportunities for materials research to benefit the orthopedic industry. Overall cost of treating patients continues to be a challenge in our industry. There are opportunities for the raw material providers to bring value by lowering overall patient treatment cost. Challenges with infections and nickel allergies are real clinical problems that could be solved with innovative materials. In addition, research and innovation should continue to push titanium forward for bony in-growth properties."

Credit: 2013 Dear Doctor, Inc. All Rights Reserved; Malvern Town Centre Dental

Prior to working at Arthrex, Hutchinson was a product development engineer for Exactech's Extremities team from 2004 to 2013 and a sales engineer for Autocam Medical from 2013 to 2016. As stated on its website (www.arthrex.com), Arthrex, based in Naples, FL, houses manufacturing operations, as well as Arthrex's premier Medical Education Center, which serves as an education destination for surgeons from around the world to learn about new products and techniques through hands-on surgical skills training programs.

Jeff Grabowski, manager of business development for QuesTek Innovations LLC, Evanston, IL, said his company continues to explore additive manufacturing and is pursuing its "Materials by Design®" methodology to demonstrate its titanium Shape Memory Alloy for in-body medical applications produced via additive. According to information on the company's website (www.questek.com), QuesTek has expertise in the field of Integrated Computational Materials Engineering (ICME). The company has employed this design method for various aerospace applications, and is now applying the technology to design alloys for medical components.

ICME high performance alloys



Credit: TITANIUM USA 2017 Conference Proceedings, ISBN #2017 Miami -0-935297-63-4

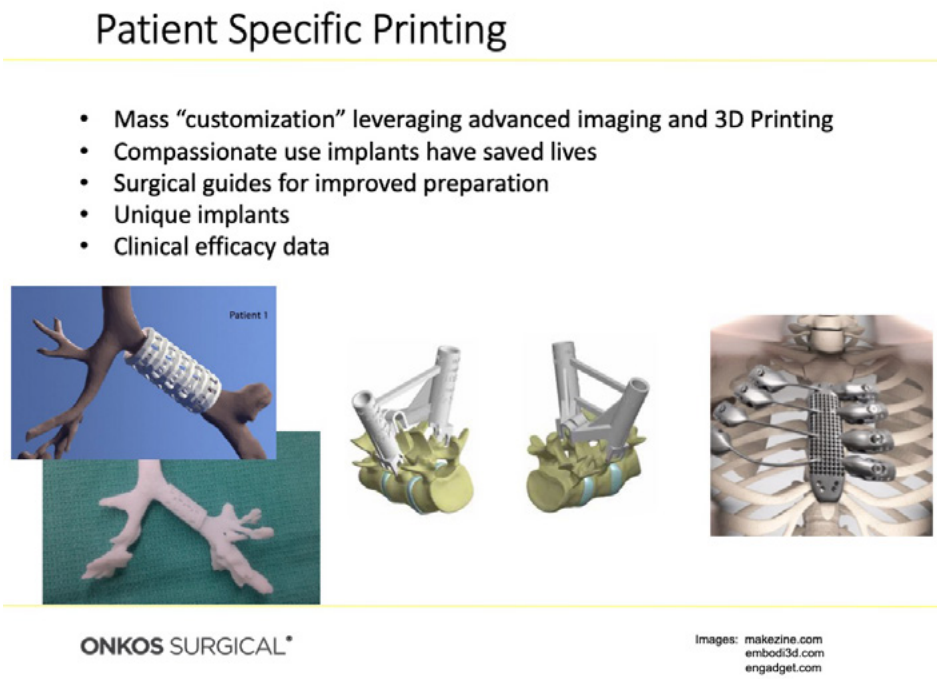
can be developed much faster and at lower cost than via traditional (trial and error) methods, according to QuesTek. ICME and Accelerated Insertion of Materials (AIM) are the design tools that allowed QuesTek to create the company's "QuesTalloy SMA," a nanodispersion-strengthened, high-performance, shape-memory alloy that the company is marketing as an improved material for use in stents and catheter wires. At laboratory scale its SMA alloy has demonstrated greatly improved radiopacity and potential for longer fatigue life. Grabowski said ICME provides an efficient way to produce an alloy with the properties needed for a given design, while AIM greatly minimizes the risk, time and costs associated with the materials qualification process. Because this SMA in part achieves strength via precipitation hardening, it may be capable of improved mechanical properties when built via Additive Manufacture since it does not rely on cold work for strength as Nitinol does.

Speakers at the most recent Las Vegas conference provided updates on titanium implants and instruments used in the medical sector. Gene Kulesha of Onkos Surgical presented information on "a true industrial revolution" in the 3D printing of medical devices. Customized implants using titanium 3D printing have improved and the technology can support patient-specific printing, according to Kulesha. Titanium 3D printing for medical applications "has gone mainstream, but is still an untapped market. Regulatory agencies understand and embrace the technology."

According to Kulesha, "Mass customization is on a tear, but long term clinical data is needed to show this is as or more successful in terms of outcomes as current standard products and procedures."

He estimated that 3D printing of titanium medical devices registered $1 billion in 2017. "Demand is outpacing supply," he said. "There are few qualified contact manufacturers. Mass customization (of this market) is a maybe; clinical benefits must outweigh costs."

The global orthopedic device market was $52 billion in 2017, and the United States accounts for 50 percent of that market. Titanium accounts for up to 70 percent of hip, spine and trauma implants. He described 3D printed titanium knee implants as a "success story in the making;" a potential $4-billion market opportunity. Knee surgery, which requires numerous bone cuts



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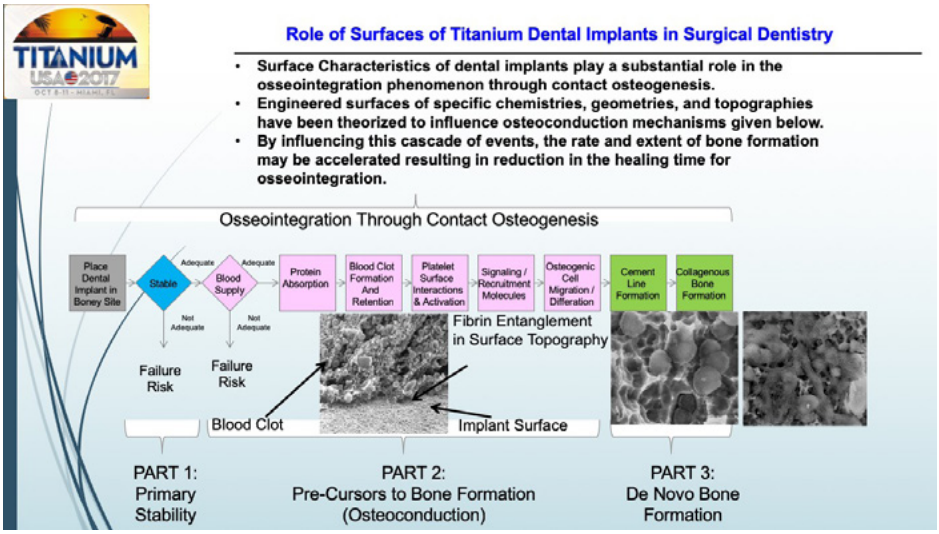
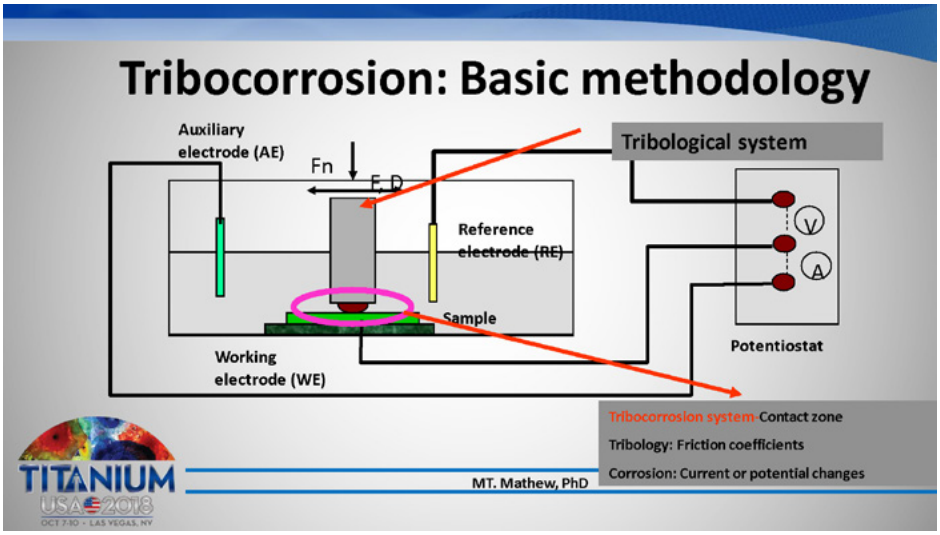


Credit: TITANIUM USA 2017 Conference Proceedings, ISBN #2017 Miami -0-935297-63-4

and soft tissue manipulation, is more complex than hip surgery, he said.

Prabhu Gubbi, Ph.D., a technical specialist and scheme manager with BSI Group America reported on "Medical Device Regulatory Changes in Europe." BSI, a global company, with 81,000 clients in 180 countries, is involved in certification, consulting, and standards-related products and services. Gubbi said regulatory changes include classification rules, conformity assessment, general safety and performance, technical file documentation, risk management and clinical evidence.

Gubbi said that, for dealing with medical device regulatory changes, BSI helps customers bring their medical device products to market. "We ensure patient safety while supporting timely access to medical device technology globally. We provide our customers with conformity assessments, evaluations and certifications that are recognized and accepted worldwide. We provide added value to customers through information, training, knowledge and management systems solutions to anticipate, maintain and exceed compliance with internal and external requirements."

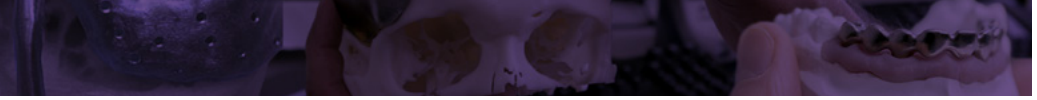


Credit: TITANIUM USA 2018 Conference Proceedings ISBN #0-935297-66-9

Mathew Thoppil, Ph.D., associate professor, Department of Biomedical Science at the University of Illinois, Chicago School of Medicine, addressed "Tribocorrosion Aspects of Titanium-Based Biomedical Implants: Current Concerns and New Directions." Thoppil said that the U.S. Center for Disease Control has estimated 78 million people will suffer from arthritis by the year 2040. "Titanium is widely used in hip and other joint replacement surgeries such as shoulder, elbow or knee or spinal fixation devices and in dentistry applications."

Thoppil defined tribocorrosion as an irreversible transformation of material in tribological contact caused by simultaneous physicochemical and mechanical surface interactions. "Upon implantation, electrochemical interactions are induced by corrosion between the implant materials. As a result, complications like pitting, fretting, galvanic corrosion, and stress corrosion occur. Implant failure has been also associated with several other causes, such as infections in the implanted area, mechanical loosening, bone resorption, and an increase in time taken for osseointegration to occur apart from the fibrous tissue formation."

The study also examined micro-arc oxidation and plasma electrolytic oxidation for titanium implants, as well as titanium nanotube corrosion resistance. Thoppil said that further research is needed to develop new surface coatings and modification methods to minimize tribocorrosion. ■



Thomas Zuccarini, the medical market director for Carpenter, said the company has closely monitored additive manufacturing technology trends in recent years. "Our customers recognize the value and potential for additive manufacturing, but also realize there are challenges. We are anticipating these challenges on behalf of our customers." Zuccarini said Carpenter's mission is to address both innovation and scalability.

Carpenter's Acquisitions, Investments Reveal Game Plan to Pursue Additive Manufacturing

The global medical market, like many of the key business sectors targeted by the titanium industry, continues to express interest in the potential for additive manufacturing technology. The hope is that additive manufacturing, in the not-too-distant future, will have the capability to cost-effectively produce "customized" titanium medical implants, instruments and devices. Investment in this field is ongoing and many players—metal suppliers, contract manufacturers, designers, and original equipment manufacturers—are evaluating the promise of additive manufacturing.

Philadelphia-based material supplier Carpenter Technology Corp., during the last two years, has made targeted investments and acquisitions to strategically assemble a "point-to-point" process in additive manufacturing, encompassing design and engineering, material selection, production, testing and qualification of finished parts, in order to compete effectively in this arena. Titanium alloys and the medical sector are parts of the company's overall business portfolio (over 600 specialty alloy systems for applications in markets such as aerospace, energy, industrial and defense).

A review of recent transactions by Carpenter reveals at least part of the company's game plan. In March 2017 Carpenter completed its acquisition of Puris LLC, a producer of titanium powder for additive manufacturing and advanced technology applications. The purchase price was $35 million. As stated in the company's release on Globe Newswire, the "addition of Puris provides Carpenter with immediate entry into the rapidly growing titanium powder market (and) an expanded presence in additive manufacturing. Operations will continue at Puris' existing production site in Bruceton Mills, WV, and the facility will operate as a functional unit of Carpenter Powder Products."

In October 2018 Carpenter purchased LPW Technology Ltd., an international producer and supplier of additive manufacturing powder metals, based in England. In early 2018 Carpenter acquired MB CalRAM, a California company specializing in the fabrication of titanium components using electron beam melting technology and powder-bed fusion additive manufacturing.

The CalRAM unit will be able to produce parts for customers. Tony Thene, the president and chief executive officer of Carpenter, quoted in a Globe Newswire press release, said that CalRAM "brings industry leading technology and processes coupled with a talented team and is a strong complement to Carpenter's deep technical experience in producing highly engineered metal powders and wire for additive manufacturing applications, including mission-critical applications such as orthopedic implants."

Thomas Zuccarini
Medical Market Director
Carpenter Dynamet

Finally, in what may be the most important move in Carpenter's efforts to fortify its position in additive manufacturing, the company unveiled plans to build an "Emerging Technology Center" in Athens, AL, to focus on research and development. Carpenter, in a July 2018 press statement, said it expects "to invest $52 million in the Emerging Technology Center, which will create approximately 60 jobs over the next five years. This investment is a critical component in executing Carpenter's key growth initiatives and is aligned with its business strategy of becoming a complete end-to-end solutions provider in the additive

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Aluminum Alloys

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manufacturing area." According to the July 2018 press statement, Carpenter's 500,000-square-foot Alabama manufacturing facility, which began operations in 2014, produces high-end specialty alloy products, primarily for the aerospace and energy markets.

Thene explained that "by utilizing our metallurgical and process expertise, the Emerging Technology Center is where we will develop and implement future solutions for our customers ranging from new alloys to revolutionary 3-D printed parts. Our recent investments in additive manufacturing and soft magnetics indicate our ongoing commitment to the rapidly changing landscape of our industry." In a parallel effort to complement the Athens operations, Carpenter said it has opened an additive technology center in Reading, PA.

Thomas Zuccarini, the medical market director for Carpenter, said the company has closely monitored additive manufacturing technology trends in recent years. "Our customers recognize the value and potential for additive manufacturing, but also realize there are challenges. We are anticipating these challenges on behalf of our customers." Zuccarini said Carpenter's mission is to address both innovation and scalability.

Richard Grylls, the director of applications engineering for additive manufacturing, noted that Carpenter's recent acquisitions, mentioned above, offer an integrated, comprehensive approach to developing end-use components. "We can use our assets to develop applications and select the technology that most cost-effectively and appropriately meets the need. Some companies have achieved 'point solutions' in additive manufacturing, but there's so much that isn't known. Our goal is to understand the overall process."

Generally speaking, titanium medical implants for knees and shoulders are relatively small parts and small volumes. "But will additive manufacturing technology be fast enough to produce the required number of parts?" Grylls said. "Can you get the mechanical properties and wear resistance properties you need?" Grylls said Carpenter is currently working with medical industry original equipment manufacturers (OEMs) to develop implants, but added that he wasn't at liberty to share details. However, he did point out that additive manufacturing means OEMs no longer have to follow "the normal rules of metallurgy when developing materials and components." ■

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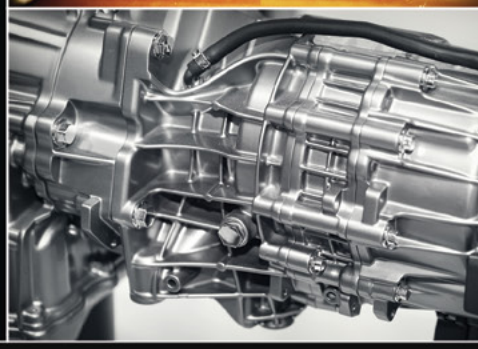

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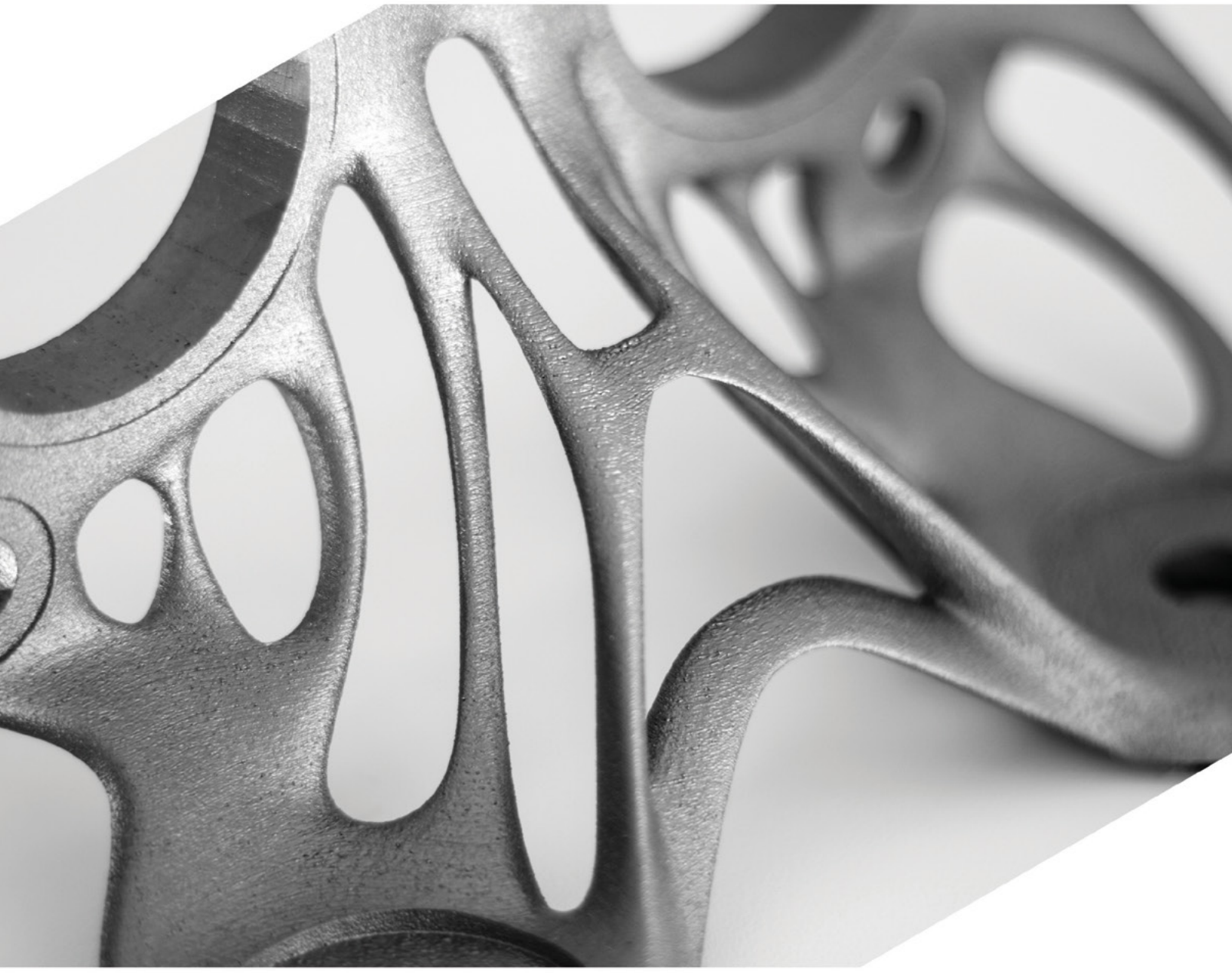

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A stay at the Hotel Savoyen Vienna is bound to be unforgettable – just like its namesake, Prince Eugene of Savoy. The hotel effortlessly combines old and new, occupying a revitalized building that was once home to the imperial Austrian state and court print works.

Organized industry tours include:

Borealis AG Europe's second and world`s eighth largest producer of polyethylene (PE) and with the acquisition of Agrolinz Melamine International (AMI), the company is expanding its product portfolio to include melamine and fertilizer. The tour will be hosted through a bus excursion and includes a general overview of Chemiepark Linz and Borealis Linz.

Rolling Mill Tour of BÖHLER. voestalpine BÖHLER Bleche GmbH & Co KG is a producer of single cross rolled sheets and plates of steel and special alloys. The product range varies from tool and high speed steel to special materials for the energy, oil & gas and aerospace industry. Within the special material segment super austenitic and super duplex steels with high demands on corrosion and heat resistance, nickel and nickel base alloys for even higher demands and titanium and titanium alloys are manufactured. voestalpine BÖHLER Bleche manufactures according the latest technological standards and has recently invested in state of the art rolling, heat treatment and flattening equipment, including a vacuum creep flattening machine. The tour will include both mill sites, the rolling and the finishing mill, where all manufacturing steps from heat treatment, cutting, quality control, flattening and surface finishing are performed.

Mobile Convention Center, Alabama USA

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ITA's 35th anniversary meeting, hosted and organized by the International Titanium Association (ITA). TITANIUM USA 2019 will be held at the SMG Mobile Convention Center in Alabama. Presentations will host a variety of topics including world titanium supply & demand trends; powder metallurgy / additive manufacturing; commercial aerospace; medical; and the 2nd anTi Corrosion day will be dedicated to topics serving the global industrial markets.

Industry Related Tours:

Just minutes from the Convention Center is Airbus Mobile, an **assembly site for Airbus's Commercial Airplanes** division. The site is the major assembly and delivery site for Airbus commercial aircraft in the United States and will be one of the largest employment centers in the state. The site will serve as one of four final assembly and delivery points for the Airbus A320 family. Aircraft will be delivered as a whole from the Mobile Aeroplex at Brookley surrounding the Airbus facility. Special Thanks to Airbus SAS for making this tour possible.

Tuesday Evening Tour & Dinner will be offered at the USS Alabama Memorial Park. USS Alabama (BB-60), a South Dakota-class battleship, was the sixth ship of the United States Navy named after the US state of Alabama.

Alabama was commissioned in 1942 and served in World War II in the Atlantic and Pacific theaters. Alabama was decommissioned on 9 January 1947 and placed in the reserve fleet in Puget Sound Naval Shipyard Bremerton, Washington. Visitors are allowed to view the inside of the main gun turrets and anti-aircraft guns. The powder magazine was opened to the public through some holes that were cut, and stairs put in.

In conjunction with the Singapore Air Show Singapore ITA is pleased to host the 2nd TITANIUM ASIA conference in Singapore at the Grand Hyatt Singapore hotel.

Exhibition Reservations are available now

Download TITANIUM ASIA 2018 Executive Summary Report

TITANIUM ASIA 2018 Conference Video Proceedings

Based just outside of Denver, Colorado, the ITA (Titanium.org), is a membership-based international trade association dedicated to the titanium metal industry. Current ITA membership is comprised of more than 200 organizations and over 1,500 individual members worldwide. Established in 1984, the ITA's main mission is to connect the public interested in using titanium with specialists from across the globe who may offer sales and technical assistance.

ITA educates engineers, designers and business executives on titanium's superior properties and explains how those properties may be developed to enhance products and services. The organization also strives to advance ideas in research, design, metallurgy and engineering, and serve as the leading forum to cultivate the exchange of ideas and support a diverse, dynamic, global industry.

The executive summary report was developed by Michael Gabriele, an independent freelance writer on behalf of the International Titanium Association (ITA) and is intended to provide a broad overview of the event. The summary provided is based on the information interpreted, but is not intended to be either exhaustive or inclusive of all announcements or information provided at the event.

Work Anniversaries:

John Spafford for 6 years at TITANIUM INDUSTRIES

Mike Poorman for 12 years at ReMelt Scientific, Inc.

Ray Dias for 7 years at Argus Media

Isao Uchida for 1 year at Itocchu Metals Corp.

Jennifer Walkowiak for 13 years at TIMET

John Pyle for 4 years at Stamco Industries

Guru Sekhar for 3 years at Corrtech Energy Limited

Kathryn Junkins for 11 years at Carpenter Technology Corporation

Richard Leeson for 10 years at United Performance Metals (Vulcanium Corporation)

Patty Brown for 4 years at Airborne Technologies, Inc.

Rebecca (Bach) Lane for 3 years at Airbus Group Inc.

Career Announcements:

Tom Witheford President at Special Metals

Mike Paponetti Southeast Sales Manager at Solar Atmospheres South Carolina

In Memorium:

James Howard, Sr.
(1935 – 2019)

Passed away Tuesday, Feb. 12, 2019, at Camden-Clark Medical Center in Parkersburg, W.Va.

He was an avid outdoorsman who loved hunting and fishing. James was a 1953 graduate of Toronto High School and a 1957 graduate of the University of Dayton, where he was a member of the basketball team. He was an active member of the Simpson United Methodist Church in Steubenville, Ohio and the St. Paul United Methodist Church in Tuppers Plains, Ohio. James retired from Timet Titanium Metals in Toronto, Ohio, where he was a Chief Electrical Engineer and the President of the Steel Workers Union for 20 years.

David Seitz
(1943 – 2019)

Passed away peacefully at home Feb. 5, 2019.

He served in the United States Army from 1966 until 1968 at the Army Materials and Mechanics Research Center (AMMRC) in Watertown, Mass., and continued to work there as a civilian until 1985. While at AMMRC, he performed and published research in the areas of stress corrosion cracking of titanium alloys and high strength steels, and in the early use of titanium alloys for body implants. He served on the Department of Defense (DoD) Manufacturing Technology Advisory Group and was instrumental in the organization of several government/industry conferences addressing manufacturing cost driver analysis for Army commodity areas.

Dr. Richard Carlson
(1931 - 2019)

Passed away Saturday, March 9, 2019

Richard studied chemistry at Baldwin Wallace College in Berea, and received a PhD in chemistry from the University of Cincinnati. He worked 41 years at Mound Laboratory, Miamisburg, where components for nuclear weapons were produced. He developed a procedure to make titanium subhydride used by the DOE among others as a fuel in pyrotechnic detonators and igniters. This material is notable because of its safety.

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International Titanium Association Welcome New Members 2019

Kolene Corporation
www.kolene.com

Kolene Corporation was founded in 1939 in Detroit by John Shoemaker. It continues today as a privately held company with 3rd and 4th generation Shoemakers active in the business.

Kolene specializes in designing and developing metal cleaning processes utilizing fused or molten inorganic salts. One of our major applications is surface condition of titanium oxides and forming lubricant removal. Surface conditioning prior to pickling and chemical milling promotes uniform surfaces and metal removal. Processes to remove vitreous lubricants and molybdenum disulfide are available.

Kolene designs both process equipment and process chemicals to provide single-source cleaning systems.

Precision Abrasives
www.precisionabrasives.net

Precision Abrasives - We are the industry leader in abrasives and abrasive applications for the primary metals market. We offer the most reliable technical services and the widest selection of engineered products in the industry

We are the Largest US Distributor for Conditioning Wheels, Roll Grinding Wheels and Large-Diameter Cut-Off Wheels. We are Norton's Only Primary Metals Market Specialty Distributor and VSM's Fastest Growing Distributor over the last four years. We are the Exclusive Distributor for Mid-West Machines for the Primary Metals Market.

Kennametal
www.kennametal.com

Kennametal is a global leader in the production of master alloys and converter of ultra-pure, and converter of ultra-pure, premium-quality custom metal alloys and metal-alloy powders.

Specialty Metallurgical
www.smptitanium.com

Specialty Metallurgical Products (SMP) was started in 1984 by James H. Clark (Jim Clark Sr.), when he invisioned the need for a better, less costly grain refiner than the then standard master alloy. Originally the company was started to produce Master Alloy in Shot form, however that product never made it into the market place. Instead SMP was the first company to produce and offer a 100% titanium tablet to the aluminum alloy producers, free from binders and salts. Today, almost all aluminum smelters use 100% titanium tablets/pucks to make their titanium additions.

The Company's manufacturing Plant and Offices are located in Red Lion, Pennsylvania and have been since 1994. Although the Company has relocated several times in the last 20 years, it has never moved out of York County, PA.

Westbrook
http://www.wbrl.co.uk/

Buyers and seller of Titanium scrap. All grades and forms of Ti Scrap bought for use in UK production of Ferro Titanium for on sale Worldwide to end users. Standard and special grades produced to order with all packing and sizing options available to satisfy customer requirements. We also buy/trade Titanium scrap for upgrading, processing and on sale.

CMI Industry Metals
www.cmigroupe.com

CMI Group designs, integrates, modernizes and maintains equipment for industries like energy, defense, metals, environment and transport and industry in general.

Present on all five continents, CMI numbers more than 5500 experienced employees who combine technological expertise and the management of international projects.

As such, CMI has supplied innovative heat treatment technologies, combining field proven reliability and cutting edge technology for every application since 1923.

Grounded on the experience of well-known brands like Electric Furnace Company (EFCO) and French ATI Furnace, CMI Industry provides heat treatment products to process a wide range of materials in a multitude of sizes, shapes and thermal cycles.

Based on its great historical knowledge and evidenced by numerous worldwide references, heat treatment products supplied by CMI comply with local, national and international safety and quality standards, including: NFPA 86; NEC(NFPA 70); UL508a; AMS 2750; NADCAP.

Jinhua Top-Link
WWW.TOP-LINK.CC

Established in 2009.Jinhua Top-link Imp. & Exp. Co., Ltd is a professional exporter and supplier of rare metal materials, such as Titanium Molybdenum, Nickel, Etc. Our key products are Titanium Plate. Titanium Bar. Titanium Tube, Titanium Flange, Titanium Fasteners Clad materials etc. We are located in Jinhua, Zhejiang province, China with convenient transportation access. All of our products comply with international quality standards and are widely used in aerospace medical and other fields.

The products are greatly appreciated in a variety of different markets throughout the world. Our company cherishes every customer, and spares no effort to provide our customers with first-class products and technical services.

Stack Metallurgical Group
http://www.stackmet.com/

The Stack Metallurgical Group consists of heat treating facilities in Portland, Oregon and Spokane, Washington, as well as Aerospace Aluminum Processing in Salt Lake City, Utah. The combined capacity and versatility of these three facilities rivals nearly any other thermal processor in the western United States.

The Stack family prides itself on safety, quality, and outstanding customer service. We have long been a trusted supplier to numerous quality-critical industries including aerospace, energy, and medical implant. As evidence of our service-based culture, the Salt Lake City facility is the proud recipient of the Boeing Supplier Excellence Award 9 times.

Advanced Optical Technologies Inc.
www.advanced-optical.com

Advanced Optical Technologies Inc. (AOT) provides non-destructive surface and crystallographic characterization of titanium and other aerospace materials. AOT's patented polarization-classification imaging (PCI) is an extension of polarized-light microscopy that provides crystallographic orientation images in air at much higher speeds and over larger areas than EBSD.

AOT offers multi-dimensional micro- and nano-structural material characterization, mapping, and assessment for a more complete understanding of complex materials and devices, and develops custom sensors for defense and commercial customers.

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http://mobilealloys.com/

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Ningbo Chuangrun New Materials Co., Ltd
www.crnmc.com

Ningbo Chuangrun New Materials Company (CRNMC) is a start-up company which was established in 2012, mainly focus in manufacturing of high purity titanium. Located in Ningbo, Zhejiang Province, CRNMC possess electrolysis refining process and double-gun EB melting process in house. CRNMC also has two branches in Zunyi and Baoji, for titanium sponge manufacturing and high purity titanium processing, respectively.

CRNMC provides world-class high purity titanium products in various of purities (from 99.95% to 99.999%), serves semiconductor industry, vacuum coating industry as well as aerospace industry. Not limited to high purity ingots, CRNMC supplies high purity titanium mill products such as sheets, blanks, billets, tubes and also high purity titanium powder.

CRNMC produces in well-established quality control system with ISO 9001 certificate and conducts business with professional knowledge and absolute integrity.

Lomon Billions
www.lomonbillions.com

Lomon Billions is a processor of titanium ores into titanium dioxide, titanium tetrachloride, and soon titanium sponge. Today, we are the fourth largest titanium dioxide producer globally with 50% of our sales internationally. We are looking to expand our titanium value stream into metal. We will become a significant contributor to the titanium metal supply chain.

Aero Titanium
www.aerotitanium.com

Supplier of Titanium castings and other titanium products

Special Rare Metals AS
www.srm-sa.com

Trading, Processing and recycling of metal scrap

Sciaky, Inc

www.sciaky.com

Sciaky, Inc.is a leading provider of metal 3D printing / Additive Manufacturing (AM) solutions. Our exclusive Electron Beam Additive Manufacturing (EBAM) process is the fastest, most cost-effective 3D printing process in the market for large-scale metal parts, allowing manufacturers to save significant time and money over traditional manufacturing and prototyping processes.

We also provide state-of-the-art electron beam (EB) welding systems and advanced arc welding systems — along with extensive job shop EB welding services — to the aerospace, defense, automotive, medical and other manufacturing industries. Our state-of-the-art equipment meets rigid military specifications to manufacture items such as airframes, landing gear, jet engines, guided missiles and vehicle parts.

Titanium Marine
http://www.timarinehex.com/

Buehler

www.buehler.com

Buehler is well established as the world's leading manufacturer of materials sample preparation equipment and analysis instruments and consumables for metallurgical or metallographic use. Buehler also engineers and manufactures the complete Wilson hardness testing equipment line, accessories and ISO-certified blocks. The company partners with leading industries including automotive, aerospace, electronics, metals, medical device, energy and other manufacturers. In 2006, Buehler was acquired by ITW, a developer and processor of engineered components, industrial systems and consumables and became a part of the Test and Measurement Division which also includes Instron, North Star Imaging, Brooks Instruments, Magnaflux, Loma Systems and Avery Weigh-Tronix. ITW is a global, Fortune 200 company with 51,000 employees across 56 countries. For additional information on ITW please visit www.itw.com.

ChengdeTianda Vanadium Industry Co., Ltd.
http://www.tianda-alloys.com/en/

Founded in 1998, the company is located in Chengde, China, the world famous summer resort. The company focuses on R&D master alloy products used in the field of aviation, aerospace, military, shipbuilding, nuclear industry, metallurgy and other high temperature alloys and titanium Industry. Company is ISO quality / environment and AS9100 International aerospace quality system certificated. The current level of integrated technology, production capacity and market share ranks first in China.

With 20 years of development, the company has accumulated a wealth of experience in titanium alloys and other special areas of application development master alloy production. we are able to customize the most suitable master alloys for customers, providing them with technical consultation and problem solving solutions on intermediate alloy used in titanium alloys and super alloys while meeting with customer needs.

With our professional technical team, first class production equipment, sophisticated production process control, strict product inspection processes and mature technology advantages, we have won recognition and trust from our important customers in domestic titanium industry, and have been providing stable and reliable intermediate alloy products for them.

Centro-Metalcut
www.centrometalcut.com

Recognized internationally, Centro-Metalcut is an industry innovator in the design and manufacturing of the highest quality cutting and grinding equipment. Over the years we have expanded our fleet to offer a variety of Abrasive Saws including single or batch cutting, wet or dry cutting, Pivot, Gantry and more, as well as Conditioning Grinders offered in Stationary, Track or Overhead models.

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With products in virtually every large steel mill in the world, Centro-Metalcut has become a globally known industry leader. Every machine we build is fully tested to the highest quality standards and workmanship. We strive to build relationships with our clients that last for years to come.

Universal Alloy Corporation
http://www.universalalloy.com/

UAC began as a tool and die shop in Southern California. Since those humble beginnings, it has grown to become one of the world's leading producers of hard alloy extrusions. Today, UAC has grown to become a strong multi-national company that employs more than 1,200 people throughout our Anaheim, CA, Canton, GA, and Dumbravita, Romania facilities.

UAC operates three fully integrated extrusion mills around the globe, plus one stand-alone warehouse facility to ensure on-time delivery of customer orders. UAC Canton in Georgia USA, UAC Anaheim in California, and Universal Alloy Corporation Europe SRL located in Romania.

AKRAPOVIČ MAKES COLIN EDWARDS ITS FIRST TWO-WHEEL BRAND AMBASSADOR

Akrapovič has the great honour of announcing that its first-ever world champion, Colin Edwards, has been made its inaugural two-wheel brand ambassador, and that he will continue the story and relationship that has seen him become an important part of the company's history.

Akrapovič has the great honour of announcing that its first-ever world champion, Colin Edwards, has been made its inaugural two-wheel brand ambassador, and that he will continue the story and relationship that has seen him become an important part of the company's history. This honour has been bestowed on Edwards in recognition of the American's achievement in winning the WorldSBK Championship in 2000 on his Akrapovič-equipped Honda and becoming the first person to claim a world title for the Slovenian company. Edwards repeated his championship success in 2002, and his initial triumph led the way to Akrapovič now having over 100 world champions in many disciplines.

Edwards is the first motorcycle racer to be honoured as an Akrapovič brand ambassador, and his involvement is extremely meaningful for the company's #TrustedByChampions ethos because not only did he use Akrapovič exhausts in his WorldSBK championship seasons, but he also raced for different manufacturers in MotoGP – most of which used Akrapovič exhaust systems – along with twice winning the prestigious Suzuka 8 hours on an Akrapovič-equipped Honda. Edwards continued to race with Akrapovič until he retired from the pinnacle of the sport in 2014. His input, involvement, and knowledge of Akrapovič on different machinery in varying disciplines is second to none, and his constant involvement and success with the brand further cements the bond between Edwards and Akrapovič.

Akrapovič looks forward to Edwards and the #TrustedByChampions ethos communicating the advantages of the company's products in 2019, including aspects of performance, weight, durability, innovations, and much more, all of which the American has experienced in his career, and so he knows better than most the benefits that can be reaped in racing with an Akrapovič exhaust. His involvement in his own motorcycle school, the Texas Tornado Boot Camp in the US, as well as many other TV, personal, and sports appearances throughout the race season, places him in a perfect position to convey the benefits of Akrapovič to a wider audience.

More of what Edwards will be doing as an Akrapovič brand ambassador will be announced in the new year, but so far he has visited Akrapovič HQ in Ivančna Gorica and the production facilities in Črnomelj. His first official appearance as an Akrapovič brand ambassador was as a surprise guest at the Akrapovič New Year's get-together for all the employees of the company, where he was a very welcome and popular visitor. During this latest visit to Akrapovič in his new role, Edwards was honoured by the company because it named one of its conference rooms after him. He unveiled a special commemorative plaque with Igor Akrapovič in honour of his achievements while using Akrapovič exhausts throughout his career and becoming the company's first-ever world champion.

Colin Edwards, Akrapovič Brand Ambassador:

"It's an honour to be an Akrapovič brand ambassador. When I came here a few months ago, I was very impressed with what I saw at the factories. Akrapovič is a top-level company that's good to be associated with. Everything is top level, from the workshop on. It's good to be associated with a product that's the best and easy to understand. It's an honour and a pleasure to have a room named after me and to be part of the company. We're planning many things to promote the brand. It will be a fun adventure."

Igor Akrapovič, Akrapovič Company Founder and Owner:

"It's very special to have the first Akrapovič brand ambassador from the two-wheeled world, and it's extremely fitting that it's Colin. It was such a significant moment in the history of the company when he won the world championship with us in 2000. I remember doing a huge amount of testing on his bike because Honda kept developing the engine and we had to update the exhaust every time. We worked really hard to get what they needed – I think it was more than forty modifications – but it's part of our DNA to get the best, so the harder they worked us the more it paid off, and together Colin, Honda, and we won the championship. Akrapovič is pleased to have him as part of the family, and we look forward to working with him."

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ALD SUPPORTS TALENTED YOUNG SCIENTISTS

During this year's award ceremony on October 17th, 2018, 33 students from Anhalt University were honored for their excellent academic performance with a Deutschlandstipendium (Germany scholarship), including two scholarship recipients supported by ALD Vacuum Technologies GmbH. After the ceremony distributing certificates to both the sponsors and scholarship recipients, the two groups got the chance to get to know each other better during a get-together followed by dinner.

The Deutschlandstipendium was launched in 2011 (www.deutschlandstipendium.de) and supports university students and new students whose backgrounds indicate they will excel in their studies and their careers. The merit requirements for granting the scholarships have specifically been designed to be broad in scope: In addition to outstanding performance at school and on the Abitur examination, personal and social engagement are key factors.

The ALD issues two scholarships pear year and university in different departments as part of the Deutschlandstipendium program: to students at the Darmstadt University of Applied Sciences, Aschaffenburg University, the University of Applied Sciences Mittelhessen, and Anhalt University.

As one of the world's leading manufacturers of vacuum technology systems in the metallurgy and heat treatment fields, ALD has a passion for supporting excellent performance both within and outside of the company. Promoting and funding young talented students is especially important to us.

In addition, ALD regularly offers positions to student workers and for students to complete Bachelor's or Masters theses with us. Detailed information is available at www.ald-vt.com/de/karriere/ and www.ald-vt.com/de/karriere/jobs/.

GENERAL MANAGER HIRED TO OVERSEE TACTIC DIVISION OF LABORATORY TESTING INC.

HATFIELD, PA, November 20, 2018 – Laboratory Testing Inc. (LTI) has hired a General Manager to oversee its new ultrasonic testing (UT) equipment division, TAC Technical Instrument Corporation (TACTIC), in Trenton, New Jersey. The position was filled by Michael Coulton, who brings over 30 years of high-level leadership experience to the company.

As General Manager of TACTIC, Coulton will have responsibility for developing and implementing operational business plans and strategic long-range plans, including organizational design and development, the supply chain, production processes, and new product and service offerings. For the past two years, Coulton was employed by McCarthy Engineering Associates, Inc. as Chief Operating Officer. His prior employer was Benjamin Obdyke Inc. for 30 years, where he most recently was the General Manager. Coulton is a graduate of Drexel University with a Bachelor of Science degree in Commerce and Engineering Sciences.

TACTIC was purchased by Laboratory Testing Inc. on July 20, 2018. The two companies have a long-standing relationship going back to the early 1980's, when LTI purchased its first immersion ultrasonic test system from TACTIC to perform UT testing. LTI currently runs seven immersion UT systems manufactured by TACTIC on two work shifts.

TAC Technical Instrument Corporation has been in the ultrasonic inspection business since 1962, developing and selling a product line of immersion ultrasonic inspection systems and accessories, providing parts, repairs and training. The company previously performed independent ultrasonic testing services, which are now being offered through LTI. The majority of TACTIC's standard products are designed to inspect cylindrical materials, such as tube, pipe, bar and billet, however, the company has also provided UT equipment to inspect hexagonal and square billet.

"We anticipate a great future for TACTIC and are very excited to see how Michael will lead the division," said Mike McVaugh, CEO/President of LTI. "His 30 years of experience in manufacturing, with positions of increasing responsibility, provide an extensive background in the areas of production, engineering product development and management to take TACTIC to new levels."

Laboratory Testing is an accredited, independent materials testing laboratory that offers a wide-range of destructive testing, nondestructive testing and metrology services to businesses in the aerospace, power generation, defense, medical and other industries. Precision test specimens are prepared in the machine shop at LTI for all types of testing.

About Laboratory Testing Inc. -- Laboratory Testing Inc. (LTI) of Hatfield, PA is an independent, family-owned materials testing and metrology laboratory in business since 1984. The laboratory specializes in metal testing, but also analyzes powdered metals, ores, ferroalloys, polymers, composites and ceramics. The services offered by LTI include mechanical testing, metallurgical testing, chemical analysis, corrosion testing, nondestructive testing, specimen machining, failure analysis, dimensional inspection and calibration. All results are documented in Certified Test Reports or Certificates of Calibration. LTI is NADCAP and A2LA accredited, ISO/IEC 17025 certified and in compliance with ISO 9001 and ISO 13485. LTI Metrology, a division of Laboratory Testing Inc., provides NIST-traceable dimensional inspection and calibration services. On-site calibration, repairs, new instruments and replacement parts are offered. Information on Laboratory Testing Inc. services and accreditations is available at www.labtesting.com, sales@labtesting.com or 800-784-2882.

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STRONG FOCUS ON CUSTOMER SERVICE AND OPERATIONS AT AMETEK SMP WITH SERIES OF NEW APPOINTMENTS

AMETEK Specialty Metal Products (SMP) is delighted to announce a series of key appointments. The Division includes Reading Alloys, Hamilton Precision Metals, Superior Tube, Fine Tubes, SMP Eighty Four and SMP Wallingford, all experts in their fields with a total of six manufacturing locations and a network of sales offices across the globe. As a world leader in the manufacture of high purity alloy powders and master alloys, precision metal tubes, strip and foil, SMP places a high premium on the recruitment and development of people who share its commitment to industry-leading customer service.

Matthew (Matt) Houston — Divisional Vice President, Operations I SMP

Joining SMP with a wealth of metals company experience, including the management of multiple facilities, Matt is responsible for all aspects of the Division's global operations performance – safety, quality and delivery – and for the execution of defined improvement initiatives. Based in Lancaster, PA, he will be the divisional mentor for the implementation of Lean-Six Sigma tools to drive continuous improvement at all SMP locations. An important member of the Senior Leadership Team, Matt also will help ensure the alignment of the goals and initiatives of Sales, Operations, and Finance.

Matt holds a Bachelor of Science degree in Metallurgical Engineering from University of Nevada Reno, as well as a Master of Business Administration degree from Indiana University of Pennsylvania. He spent over 11 years at industry-leading corporations managing multiple turnaround assignments, including in Russia. His more recent assignments were as Director of Engineering and Technology and Director Manufacturing Operations as well as Director of Global Business Transformation in the metal industry.

David Cawse — Operations Director I Fine Tubes

Reporting to Matt Houston is David Cawse, who was appointed as Operations Director at Fine Tubes. In line with an SMP-wide commitment to strengthening its operations function, David will focus his extensive leadership experience on enhancing Fine Tubes' strong reputation for quality and customer service.

Having started his career at Zarlink Semiconductor Plymouth in the United Kingdom as an Equipment Technician, he progressed to Principal Engineer, Manufacturing Manager, Customer Services Manager, Chief Operations Officer, and Company Director before joining Bombardier Transportation in Plymouth as Operations Director. In 2012, he took on the role of Head of Manufacturing UK and Denmark. David also has held the role of Chair of the Plymouth Manufacturing Group.

Jim Lampert — Plant Manager| SMP Wallingford

In his new role, Jim has overall responsibility for the management of all aspects of the SMP plant in Wallingford, CT, as part of the Division's Leadership Team.

Most recently, Jim worked as the Operations Manager, overseeing the plant production since 2013. He has a Bachelor of Science degree in Business Administration – Management and an MBA degree in Strategic Management from Sacred Heart University.

Casimir (Cas) Koshinski — Plant Manager I Hamilton Precision Metals

Cas oversees all operational activities at Hamilton's Lancaster, PA, facility ensuring worker safety, compliance with environmental regulations, and the continuous improvement of all operations through lean initiatives and individual employee development.

With an extensive background in the metals industry, Cas joins Hamilton from Leonhardt Manufacturing, a contractor of tubular metal products. He holds a Bachelor of Science degree in Metallurgical Engineering/Materials Science from Carnegie Mellon.

Ryan Cicciu — Regional Sales Manager, New England I SMP

Ryan will identify and develop new customers and product applications for the Division's tube, strip and powder products. Based out of Boston, he covers the New England region.

Ryan joins SMP with global sales and marketing experience in military, avionics, transportation, medical, industrial, telecommunications, and computing markets. He has a Bachelor of Science degree from Bryant University.

Andrew (Andy) Blankemeier — Regional Sales Manager I SMP

Andy will focus on the Division's powder, tube and strip products for medical and industrial applications. Based out of Minneapolis, he will cover the North Central Region.

Andy joins SMP with experience in developing medical sales opportunities with strategic accounts. He holds a Bachelor of Science degree in Biomedical Engineering from Wright State University and a Master of Science in Materials Science and Engineering degree from The Ohio State University.

SERIES OF NEW APPOINTMENTS AT AMETEK SMP *(continued)*

Navil Gada — Director Financial Planning & Analysis I SMP

Based at the Division's Collegeville, PA, facility, Navil will provide vital support to the business decision-making process with financial consulting and strategic analysis to senior management. That includes the preparation of KPIs and other dashboard reporting; customer and product profitability analyses; the assessment of new commercial and capital expenditure opportunities; due diligence studies pertaining to acquisitions; and other projects requested by senior management.

Navil has a broad accounting and finance background gained from positions held at such companies as Johnson Matthey and Corning. He also is a Six Sigma Green Belt and holds an MBA degree in Finance & Marketing from the State University of New York at Buffalo as well as a Bachelor of Engineering (Electrical) degree.

Pierpaolo Pigliacelli — Regional Sales Manager, Western Europe I SMP

Based near Paris, Pierpaolo is responsible for sales and business development in France, Italy, Switzerland, Spain and Portugal, representing the SMP Division across the board. Fluent in Italian, French and English, with some Spanish, Pierpaolo joins SMP from Acal BFi where he worked as a Field Sales Engineer in its Metals division, focusing on niche applications, such as military, nuclear, medical, energy, chemical and aerospace.

Dan Riden — Continuous Improvement Manager I Fine Tubes

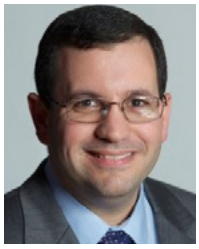
Dan's role is focused on improving shop floor manufacturing activities and product quality. He works on delivering reliable and permanent solutions that improve process control and product yields, while reducing costs. Having previously worked at Fine Tubes as a Product and Process Improvement Engineer, Dan moved to Babcock in Devonport where he led a Business Improvement work stream.

Gwynnyth Henderson — HR Manager I SMP Wallingford

Gwynn joins AMETEK SMP with a wealth of experience gained during a long and successful HR career. Her skills and expertise helped lead a number of businesses achieve excellent results, including Cabela's, Home Depot, Omni and Marriott Hotels.

Michael Zhu — Regional Sales Manager China I SMP

Working from the AMETEK Shanghai office, Michael is responsible for sales and business development across the SMP portfolio throughout China. Fluent in Mandarin and English, Michael's previous positions include Sales Manager at H.C. Starck and Sales Engineer at Hoganas China.



Michael Marucci — Vice President, Sales and Marketing, Powders

Michael is responsible for establishing the strategy, execution and implementation of all sales and marketing activities related to titanium master alloys, titanium powders, and water and gas atomized powders. Having held positions of increasing responsibility in R&D and Quality with GKN Hoeganaes, he rose to become Vice President, Commercial and Strategy at GKN Hoeganaes in New Jersey, leading its global powder business. Michael holds a Bachelor of Science degree in Materials Engineering and Master of Science degree in Engineering Management, both from Drexel University.

Caelin Middleman — HR Manager I SMP Eighty Four

In this new role, Caelin is responsible for adding new value to the business. In addition to executing all HR transactional processes, such as payroll, attendance management, HRIS management, performance management and new hire training, she will be an important member of the leadership team. She joins AMETEK SMP from Owens Corning, where she designed and implemented HR policies and procedures and hired 70+ employees for a plant start-up in Joplin, MO. Caelin graduated in 2015 from the University of Pittsburgh with a Juris Doctor and MBA degrees. Her background in law and business is complemented by a Bachelor of Arts degree in International Studies and Religious Studies.

Lee Johns — Financial Controller I Fine Tubes

Leading the financial reporting process - actual, forecast and budget - Lee is responsible for ensuring that standard costs accurately reflect operational performance and that controls and policies are adhered to in order to maximise cost control. He also will provide customer and product profitability analyses.

Lee has 18 years of experience in finance roles, including most recently as Financial Controller at UTC in Plymouth. He holds full ACCA membership and is a qualified AAT Technician.

SERIES OF NEW APPOINTMENTS AT AMETEK SMP *(continued)*

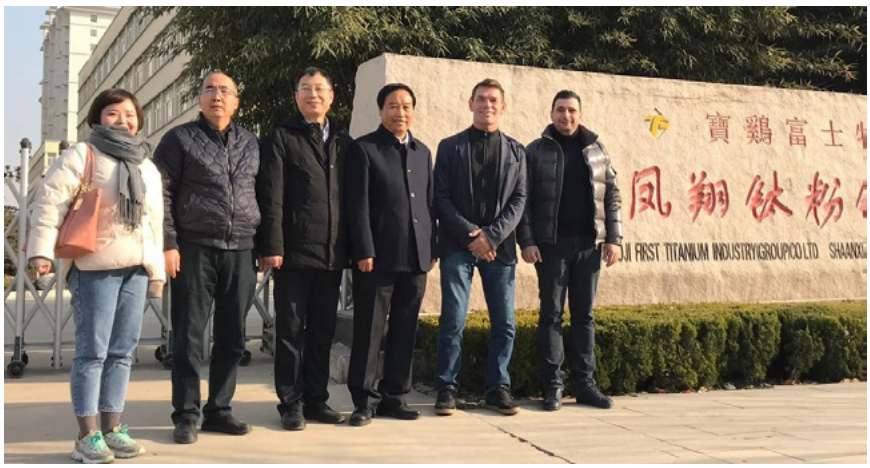
Rahul Bhattacharya — Product and Applications Improvement Engineer I Fine Tubes

In this new role, Rahul is responsible for interfacing at an in-depth technical level both with customers and internally with the Operations, Planning, QA and Technical functions. He is primarily responsible for aerospace manufacturing activities and product quality, with a particular focus on applications for Airbus and Rolls-Royce.

Joining Fine Tubes from Special Metals in Hereford, Rahul previously held research positions at the University of Strathclyde and the University of Warwick and was a member of the Research and Development team at Tata Steel Limited. He holds a Bachelor of Science degree in Metallurgy, a Master of Technology degree in Metallurgical and Materials Engineering, and PhD degree in Metallurgical Science and Engineering.

TITOMIC SIGNS MOU WITH LASTING TITANIUM TO ACCELERATE INDUSTRIAL METAL ADDITIVE MANUFACTURING

Titomic, an Australian additive manufacturing company, has signed a memorandum of understanding (MoU) with Shaanxi Lasting Titanium Industry Co. Ltd, the largest manufacturer and exporter of titanium powder in China, to accelerate Titomic Kinetic Fusion (TKF).



Lasting Titanium's Gloria Wang, Cai Longyang, Zheng Xiaofeng, Wang Qi Lu, and Titomic's Jeff Lang & Vahram Papyan. Photo via Titomic.

The TKF process involves a titanium cold-spray technique developed by the Australian Government's Commonwealth Scientific and Industrial Research Organisation (CSIRO). This method uses a supersonic gas jet to fire particles at high speed which fuse to a surface on impact. This enables dissimilar metals to combine, forming a complete component.

"This MoU will provide [an] exclusive supply of large volumes of price point titanium powder for use in Titomic's TKF systems to create new commercial opportunities for titanium in traditional industries in a more efficient and sustainable way for industrial scale manufacturing," explained Jeff Lang, the Managing Director at Titomic.

Accelerating the Titomic Kinetic Fusion process

Shaanxi Lasting Titanium Industry, commonly known as Lasting Titanium, has been supplying metal powders for additive manufacturing for the automotive, aerospace, defense, and medical industries for 20 years. The company is also involved in research into rare metal production, smelting, forging, rolling, finishing, physical and chemical analyses, and non-destructive testing.

Within the new partnership with Titomic, Lasting Titanium will enable the cooperative development of new low-cost commercially pure titanium powders for the TKF process – which uses both spherical and irregular morphology metal powders.

The versatility of TKF additive manufacturing process intends to expand production opportunity for Titomic in industries such as building, marine automotive and oil & gas where the application of titanium was previously economically unviable.

Titomic and the defense sector

Earlier this year, Titomic signed a MoU with the TAUV, a company applying additive manufacturing to applications including smarter armor for defense, law enforcement and civil industry. This $1.8 million partnership will allow the companies to manufacture Unmanned Armed Vehicles (UAV), soldier systems, and soldier sensors, using 3D printing technology.

As a result, a prototype 3D printed ruggedised soldier-enabled UAV created with Titomic's technology was created and shortlisted for the Land Forces 2018 Industry Innovation Awards, an international defense exposition held in Adelaide.

Prior to this, Titomic signed a MoU with shipbuilding company Fincantieri Australia, to develop its TKF technology. Through the Material Science Testing agreement, Titomic is currently performing kinetic fusion 3D printability tests on an alloy specified by Fincantieri. Lang added:

"This is the first step towards manufacturing large marine parts on our metal 3D printers of limitless scale."

Western Superconducting Technologies Co., Ltd. is a professional manufacturer and leading supplier of titanium alloy materials including Ti6Al4V, Ti6242, Ti6246, Ti662, Ti811, Ti1023 in the forms of ingot, billet, forgings, slab, bar and wire used in international aerospace, medical and automotive industries. Newly 8000 tons high speed forging press had already put into operation in December 2018, so our annual production capacity can be increased to 10,000 tons ingots and 8,000 tons bars.

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ATI AND BRUKER ANNOUNCE AGREEMENT TO FURTHER ADVANCE NIOBIUM-BASED SUPERCONDUCTOR TECHNOLOGY AND MANUFACTURING PROCESSES

PITTSBURGH – Allegheny Technologies Incorporated (NYSE: ATI) and Bruker Energy & Supercon Technologies (BEST), a wholly owned subsidiary of Bruker Corporation, today announced that they have entered into a joint technology development agreement to advance state-of-the-art niobium-based superconductors, including those used in magnetic resonance imaging (MRI) magnets for the medical industry, and preclinical MRI magnets used in the life-science tools industry.

Built on a 30-year collaboration between the two companies, this agreement further extends their tremendous combined expertise to develop higherperformance niobium-based alloys and apply these alloys in improved and more efficient superconductors, which are expected to enable MRI magnets with higher performance and lower total cost of ownership. The resulting products are expected to have applications in medical imaging, scientific instrumentation, particle physics research, and large-scale fusion experiments to produce energy. The advanced manufacturing and metrology processes, as well as the highly differentiated new superconductors planned under this agreement will deliver higher performance, ultimately aiming to give healthcare providers better diagnostics to improve lives. At the same time, the fully integrated supply chain will allow for process innovation to even further increase efficiency, quality and supply chain security for demanding customers.

Bruker Energy & Supercon Technologies is a leading manufacturer of highest performance superconducting wire products with a product portfolio that includes high-quality niobium-based superconductors. With more than 50 years of experience in the field of superconducting wire, BEST offers a unique and broad superconductor technology spectrum, a highly automated superconductor factory with the most advanced and integrated metrology capabilities to ensure highest conductor yield, quality and on-time deliveries. BEST has invested heavily in these unique capabilities over the last decade in order to meet a wide range of requirements for healthcare, industrial and research applications.

"This long-term agreement further strengthens the extensive cooperation between ATI and Bruker," commented Dr. Burkhard Prause, President of BEST. "We believe this collaboration will further advance the combined expertise within our businesses to create new and improved superconductor products and deliver enhanced commercial value for our healthcare and life science customers."

ATI, a global leader in refractory metal production and manufacturer of specialty alloys, materials, and components, brings more than 50 years of experience as a leading manufacturer of niobium-titanium and other specialty alloys for medical and high-energy physics applications. "ATI has long led the industry with its technical expertise and differentiated manufacturing capability for niobium-based alloys for superconductors," said Lee Weber, President of ATI Specialty Alloys and Components. "This new agreement expands our collaboration, so we may create the specialty materials that will propel the industry. The Relentless Innovation™ for which ATI is known is truly saving lives and improving the future for generations to come."

Forward-Looking Statements

This news release contains "forward-looking statements" within the meaning of the Private Securities Litigation Reform Act of 1995. Certain statements in this news release relate to future events and expectations and, as such, constitute forward-looking statements. Forward-looking statements, which may contain such words as "anticipates," "believes," "estimates," "expects," "would," "should," "will," "will likely result," "forecast," "outlook," "projects," and similar expressions, are based on management's current expectations and include known and unknown risks, uncertainties and other factors, many of which we are unable to predict or control. Our performance or achievements may differ materially from those expressed or implied in any forward-looking statements due to the following factors, among others: (a) material adverse changes in economic or industry conditions generally, including global supply and demand conditions and prices for our specialty metals; (b) material adverse changes in the markets we serve; (c) our inability to achieve the level of cost savings, productivity improvements, synergies, growth or other benefits anticipated by management from strategic investments and the integration of acquired businesses; (d) volatility in the price and availability of the raw materials that are critical to the manufacture of our products; (e) declines in the value of our defined benefit pension plan assets or unfavorable changes in laws or regulations that govern pension plan funding; (f) labor disputes or work stoppages; (g) equipment outages and (h) other risk factors summarized in our Annual Report on Form 10-K for the year ended December 31, 2017, and in other reports filed with the Securities and Exchange Commission. We assume no duty to update our forward-looking statements.

About Bruker Corporation

Bruker is enabling scientists to make breakthrough discoveries and develop new applications that improve the quality of human life. Bruker's highperformance scientific instruments and high-value analytical and diagnostic solutions enable scientists to explore life and materials at molecular, cellular and microscopic levels. In close cooperation with our customers, Bruker is enabling innovation, improved productivity and customer success in life science molecular research, in applied and pharma applications, in microscopy and nanoanalysis, and in industrial applications, as well as in cell biology, preclinical imaging, clinical phenomics and proteomics research and clinical microbiology. For more information, please visit: www.bruker.com.

Creating Value Thru Relentless Innovation™

ATI is a global manufacturer of technically advanced specialty materials and complex components. ATI revenue was $3.9 billion for the twelve-month period ended September 30, 2018. Our largest markets are aerospace & defense, particularly jet engines. We also have a strong presence in the oil & gas, electrical energy, medical, automotive, and other industrial markets. ATI is a market leader in manufacturing differentiated specialty alloys and forgings that require our unique manufacturing and precision machining capabilities and our innovative new product development competence. We are a leader in producing powders for use in next-generation jet engine forgings and 3D-printed aerospace products. See more at our website ATIMetals.com.

LABORATORY TESTING INC. RECEIVES NADCAP ACCREDITATION FOR Z2 LOW STRESS GRINDING & POLISHING

HATFIELD, PA, December 4, 2018 – Laboratory Testing Inc. (LTI) has expanded its scope of Nadcap accreditation with the addition of Z2 Low Stress Grinding and Polishing for fatigue specimen preparation. LTI's fracture mechanics lab performs High-Cycle Fatigue, Low-Cycle Fatigue, Fatigue Crack Growth and Fracture Toughness Testing services. The in-house machine shop prepares specimens required for these tests and other mechanical testing services.

LTI's Nadcap scope of accreditation in Materials Testing is extensive, covering a wide-range of chemical analysis, mechanical testing, metallography and corrosion testing services, as well as evaluation of welds, specimen heat treating and specimen preparation. In addition to (Z2) Low Stress Grinding and Polishing, the Lab's Nadcap accreditation for specimen preparation according to AC7101/7 approves LTI for (Z) Standard Specimen Machining, (Z1) Low Stress Grinding, (Z3) Cast Specimens and (Z4) Special Preparation. Precision specimens are prepared in LTI's 12,000 sq. ft. machine shop, which is built for high speed and large capacity specimen preparation.

"Maintaining an extensive list of Nadcap accreditations is just one of the ways LTI demonstrates its commitment to quality and continuous improvement. We continue to invest in new equipment and technologies, skilled experts, and training to meet the unique needs of our aerospace primes and their supply chains," said Ed Deeny, Quality Manager.

Nadcap is a global cooperative standards-setting program for aerospace, defense and related industries used to assess special process capability for compliance to aerospace audit criteria. Nadcap accreditation is awarded based on a company successfully demonstrating compliance by passing a thorough audit.

In addition to Nadcap, LTI is also ISO/IEC 17025 accredited by A2LA (American Association for Laboratory Accreditation). This accreditation demonstrates technical competence for a defined calibration and testing scope and the operation of the laboratory quality management system.

About Laboratory Testing Inc. — Laboratory Testing Inc. (LTI) of Hatfield, PA is an independent, family-owned materials testing and metrology laboratory in business since 1984. The laboratory specializes in metal testing, but also analyzes powdered metals, polymers, composites and ceramics. The services offered by LTI include mechanical testing, metallurgical testing, chemical analysis, corrosion testing, nondestructive testing, specimen machining, failure analysis, dimensional inspection and calibration. Test and inspection results are documented in Certified Reports. LTI is NADCAP accredited, ISO/IEC 17025 accredited to A2LA, and in compliance with ISO 9001 and ISO 13485. LTI Metrology, a division of Laboratory Testing Inc., provides NIST-traceable dimensional inspection and calibration services. On-site calibration, repairs, new instruments and replacement parts are offered. LTI can be contacted at www.labtesting.com, sales@labtesting.com or 800-784-2882 for more information.

AMETEK SMP DEVELOPS NEW TITANIUM STRIP PRODUCTS FOR GROUND-BREAKING MEDICAL APPLICATIONS

Hamilton Precision Metals and SMP Wallingford, two of the six businesses that comprise AMETEK Specialty Metal Products (SMP), are delighted to announce that they have added two new Titanium strip grades – grade 9 and 23 – to their product portfolio for medical applications.

Having developed a proprietary production process for both Ti grades, the two AMETEK facilities are now able to produce a thin strip that ultimately offers external charging capabilities for implanted medical devices when incorporated to the external shell. This new production technology involves a cold rolling and annealing process that yields titanium strip with outstanding microstructure characteristics and formability properties.

Historically, Ti grades 1 and 2 are used for implantable medical devices such as CRM cardiac rhythm management and drug delivery systems. However, these grades don't offer non-contact charging capabilities for batteries. Using grades 9 and 23 allows for the manufacturing of smaller devices that enable safe, external re-charging for a range of transformative neuromodulation and neurostimulation therapy applications.

"Our new Titanium strip grade products are set to make a major contribution to the treatment of Parkinson's disease, sleep apnea and chronic pain without the use of opioids," said Matt Lappen, Product Manager for SMP Strip Business. "We're very excited to be a part of this ground-breaking therapeutic advance."

AMETEK, Inc. is a leading global manufacturer of electronic instruments and electromechanical devices with annual sales of $4.5 billion. AMETEK has more than 17,000 employees at more than 150 operating locations worldwide. Supporting those operations are more than 100 sales and service facilities across the United States and in 30 other countries around the world.

AMETEK Specialty Metal Products (SMP) is a division of AMETEK, Inc. and comprises of six manufacturing facilities in the UK and USA: Reading Alloys, AMETEK SMP Eighty Four, Fine Tubes, Superior Tube, Hamilton Precision Metals and AMETEK SMP Wallingford. Collectively, the businesses represent a world-leading force in the manufacture of advanced metallurgical products for critical applications across a range of industries.

www.ametekmetals.com

SOLAR MANUFACTURING SUCCESSFULLY COMPLETES INSTALLATION OF GAS FAN QUENCH-COOLED VACUUM HOT PRESS (GFQVHP)

The world's first 100 ton vacuum hot press with gas fan quench cooling capability for up to a 4,000 pound part is now installed and in commercial operation at Refrac Systems.

CHANDLER, AZ – December 2018 - Solar Manufacturing has successfully completed the installation and startup of a large 100 ton force Vacuum Hot Press that includes a 2-Bar Gas Fan Quench cooling system (GFQVHP) for Refrac Systems' commercial and aerospace diffusion bonding operation in Chandler, AZ.

Working with Solar's engineering team, Refrac Systems selected a derivative of the Solar Manufacturing standard HLF-5748-2IQ internally quenched 2-Bar vacuum furnace as the base design. The furnace hot zone was modified to contain a 100 ton load hydraulic ram centered over the zone which is configured to diffusion bond parts up to 36" wide x 48" long x 30" tall. Besides being specifically designed to diffusion bond large plastic injection molding dies, and concurrently quench hardening them, the system is finding applications in bonding advanced superalloy heat exchangers where the quench cooling offers significant improvement on performance.

Norm Hubele, President of Refrac Systems, states: "We really drew on the extensive engineering experience base that Solar Manufacturing has for building large gas fan quench cooled vacuum furnaces coupled with our own vacuum hot pressing experience to build this very unique hot press system." Along the course of system design and development, a number of new and complex engineering solutions were needed in order to reduce the operational and ownership risks for the new type of furnace system. "Solar's engineering team really helped out with a lot of great design ideas and manufacturing experience, and the system really contains the most robust and reliable furnace engineering content that both companies could muster."

William Jones, CEO of the Solar Atmospheres family of companies, notes "Norm put together a team of engineers to design and build this state-of-the-art GFQVHP, and it contains many innovations. Throughout the entire process, Norm personally reviewed all aspects of the design and added considerable insight to the development of this unique vacuum furnace system."

Solar Manufacturing designs and manufactures a wide variety of vacuum heat treating, sintering and brazing furnaces and offers replacement hot zones, spare parts and professional service. To learn more about Solar Manufacturing, contact Pete Reh, VP of Sales, at 267-384-5040 x1509, or via email pete@solarmfg.com or visit us at www.solarmfg.com.

For more information about Refrac Systems service operation see www.refrac.com, or simply call: 800-4-REFRAC / 800-473-3722 to contact Norman Hubele or via his e-mail at norm@refrac.com.

TITANIUM ASIA CONFERENCE IN SINGAPORE PUTS SPOTLIGHT ON AEROSPACE INDUSTRY TRENDS

The International Titanium Association (ITA) will host the TITANIUM ASIA 2020 conference and exhibition, which will be held Feb. 9-10, 2020 at the Grand Hyatt Singapore, located on the Asian island city/state. The gathering in Singapore will feature guest speakers and industry experts, with each bringing their own assessment of the global titanium industry, with an emphasis on the all-important global aerospace industry. The ITA event will coincide with the 2020 Singapore Airshow, which will be held Feb. 11-16.

Conference presentations will include a variety of topics including supply and demand trends, powder metallurgy and additive manufacturing, trends and outlooks for the commercial aerospace, medical, industrial business sectors, and timely technical information on developments in new titanium alloys and titanium aluminides. The event will provide a platform to gain insights into the Asian titanium industry and will serve as a premier networking venue for business executives and consumers of titanium alike.

This is the second titanium conference in Singapore to be organized and managed by the ITA; the first was held in 2018.

The ITA is seeking technical papers for TITANIUM ASIA 2020 on the topics of commercial aerospace; industrial markets, specifically topics of waste water treatment, seawater cooling, seawater corrosion; power generation, gas processing and oil refining; land-based military applications; and titanium melting technologies. Abstracts from ITA members, non-members and academia are encouraged and welcomed. Abstract submission guidelines are located on the ITA's website https://titanium.org/page/TiAsia2020Abstracts .

Exhibition space selection is available on a "first-come, first-serve" basis, while registration and housing information will be released soon. The ITA welcomes corporate sponsorship for TITANIUM ASIA 2020, which helps promote businesses and organizations, provides goodwill to the industry to support the event, and is effective means of increasing visibility within the titanium community.

The ITA is an international trade association dedicated to the titanium metal industry. Established in 1984, the ITA's mission is to connect the public interested in using titanium with specialists from across the globe who may offer sales and technical assistance. Current ITA membership is comprised of more than 200 organizations and over 1,500 individual members worldwide.

Grand Hyatt Singapore is a Five-Star hotel with a range of modern amenities including an outdoor pool and outdoor tennis courts. For more information on TITANIUM ASIA 2020, please visit www.TitaniumAsia.org or contact the ITA by email at conference@titanium.org

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SOLAR ATMOSPHERES

ROGER A. JONES, FASM, HONORED AS CEO EMERITUS

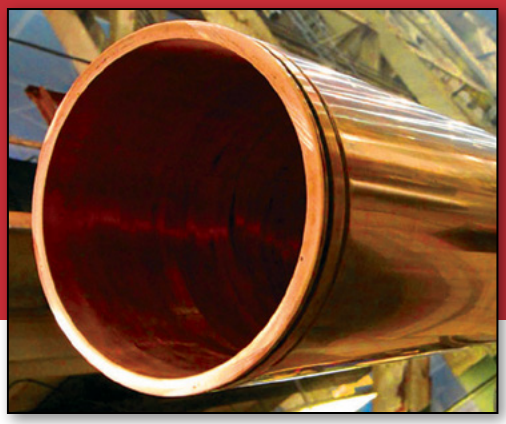
Souderton, PA, January 4 – Solar Atmospheres recently awarded the title of CEO Emeritus to Roger A. Jones, FASM. The honorary title was conferred by the company, and announces his semi-retirement as Solar Atmospheres' CEO, the culmination of 45 years of leadership and service to the vacuum heat treating industry.

A 1974 graduate of Hocking Technical College (Nelsonville, Ohio), Roger began his professional career in the heat treating industry at ABAR Corporation. Jones left ABAR in 1978 to join the newly formed Vacuum Furnace Systems Corporation (VFS), working with his father and VFS founder, William R. Jones FASM. In 1983, Roger assisted the founding of Solar Atmospheres, Inc., serving as Vice President until 1993. Jones was promoted to President in 2001, and eventually to CEO in June 2017, overseeing operations of all four heat treating facilities.

As a member of several professional societies, Jones has provided leadership and has received numerous industry awards, primarily from the American Society of Materials (ASM) and the Metal Treating Institute (MTI). Jones has been recognized time and again for his outstanding commitment and service to the vacuum heat treating industry.

ABOUT SOLAR ATMOSPHERES

Solar Atmospheres specializes in vacuum heat treating, vacuum brazing and vacuum carburizing services. Using state-of-the-art furnace technology, Solar serves over 18 metal working industries including aerospace, medical, automotive, and power generation. With processing expertise and responsive service, Solar processes small or large parts efficiently with a wide range of vacuum furnaces. Sizes range from lab furnaces to 48 feet long. Solar's unique capabilities, consistent quality and responsive service produce bright scale-free parts with minimal distortion that are delivered on time. With an in-house R&D team of metallurgists, Solar works with customers to develop innovative, custom solutions. For more information, visit www.solaratm.com.



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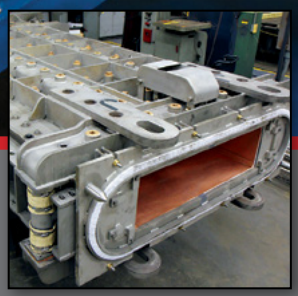

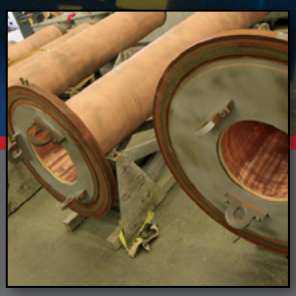

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Our services include:

- Machining, welding, straightening, and sizing of stainless steel, copper, nickel, aluminum, bronze, and carbon steel
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Above Material Technology Co., Ltd (AMT) is very good at welding metallurgy of Titanium wires and powders. AMT is very professional in producing World Top Quality Titanium Alloy Wires at superior Strength and Elongation, and Titanium alloy powders at superior Density and Flowability, for 3D Printing or Additive Manufacturing and welding. AMT holds annual production capacity 500 tons in Titanium alloy wires and powders.

AMT Titanium alloy Wires are silver shiny spooled with superior micro-alloyed as well as Low Impurity. AMT Titanium Rod owns pretty logo printing and neat end-cut. The diameter of AMT Titanium Wires and Rods can be 0.1-5.0mm.

Our Titanium Powders are highly spherical with few satellite and porosity. The oxygen and other contaminants are very low and the particle size distribution is tailorable.

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For more information, please visit our website: www.amt-alloys.com.

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Accushape™ has fully integrated facilities for processing Titanium Sponge Granules, with custom screening, particle size and shape modifications, application development, pressing and sintering of parts, machining and metal finishing processes. Accushape™ is a member of the International Titanium Association.

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Since 1991, ACNIS® International is a leading stockholder and distributor of alloyed and non-alloyed titanium in all forms and sizes. With the acquisition of AEROMETALS & Alloys in 2014 ACNIS® International has strengthened its position in the aerospace field.

ACNIS Group provides a unique cutting service in Europe, through its state-of-the-art sawing, waterjet, laser and shearing machines.

Among our wide product range, we offer bars, sheets, tubes, flat, hexagonal and square bars, tubes, welding wire, forged parts and powder. We serve our customers from our head office in Lyon, France, but also from our 3 service centers located in Paris (AEROMETALS & Alloys®), Brazil (ACNIS® Do Brasil) and China (ACNIS® Asia).

ADMA Products, Inc.

+1-330-650-4000
www.admaproducts.com

ADMA Products Inc. is AS9100 registered fully integrated manufacturer of ADMA Hydrogenated Titanium Powder, ADMATAL® net shape and near net shape powder metallurgy titanium and titanium alloy products. These products, produced by ADMA under its proprietary and patented "solid state" (non-melt) consolidation processes, meet all critical specifications and standards, including Aerospace Materials Specifications (AMS). Components made from ADMA Hydrogenated Titanium Powder are characterized by high purity, refined microstructures, low oxygen content, excellent "weld-ability", low energy input, almost 100% "buy to fly ratios", low cost, and performance that is superior to those of titanium ingot based products. ADMA additionally specializes in stainless steel, nickel, niobium, zirconium and other advanced materials produced by powder metallurgy processes.

Advanced Optical Technologies

505.313.7068
www.advanced-optical.com

Advanced Optical Technologies Inc. (AOT) provides non-destructive surface and crystallographic characterization of titanium and other aerospace materials. AOT's patented polarization-classification imaging (PCI) is an extension of polarized-light microscopy that provides crystallographic orientation images in air at much higher speeds and over larger areas than EBSD.

AOT offers multi-dimensional micro- and nano-structural material characterization, mapping, and assessment for a more complete understanding of complex materials and devices, and develops custom sensors for defense and commercial customers.

Aero Titanium

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Supplier of Titanium castings and other Titanium products

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Akrapovič is a producer and supplier of Titanium investment casting and carbon-fiber composites products. With many years of experience and constant development in the Titanium processing industry we can offer our customer high quality build to print products out of required certified material, precision and flexible delivery time and full service approach of our high specialized team support.

Producers, Distributors, Fabricators, OEM's, & Vendors to the Industry

ALD Vacuum Technologies GmbH

+49 6181 3070
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ALD Vacuum Technologies – High Tech is our Business

ALD is a worldwide leading supplier of advanced furnace systems for melting, casting, coating and heat treatment of metals under vacuum.

ALD furnaces are used for the production of especially pure and specially alloyed metals, materials and parts. Our customers are comprised of the leading manufacturers of materials used in aerospace, energy, semiconductors, medical and commercial markets for a variety of applications that require those super-alloys, reactive and refractory materials as well as rare earth and powder materials.

ALD Vacuum Technologies also is the industry leader in EB PVD Thermal Barrier Coating Systems and our Precision Casting Systems are used for super-alloy, Titanium and Ti Aluminide cast parts. Our expertise in heat treatment furnace technologies and sintering furnace technologies are utilized by leading automotive manufacturing companies as well as the tool manufacturing industries for highly critical parts in gear case and fuel injection systems and specialty tools.

ALD has worldwide representation and services through wholly owned subsidiaries in North America, Japan, Russia, Mexico, India, Thailand, Poland, France and China. With more than 20 representatives across the globe, working together with nearly 400 employees at our corporate headquarters in Hanau, Germany ALD is able to provide timely and knowledgeable services and support.

ALD is part of the AMG, Advanced Metallurgical Group N.V., Netherlands, a public listed technology company with leading market position and interesting growth potential.

Alloy Works, Inc.

704-645-0511 ext. 118
JWoock@Alloyworks.com; Todd.Tomczyk@timet.com

AlloyWorks, a TIMET company, specializes in plasma cold hearth melting titanium aluminides, standard titanium alloys, and CP. AlloyWorks products are used to produce parts in aerospace, industrial, and military applications. AlloyWorks is AS9100, ISO 9001 certified and holds approvals from several leading engine companies.

Alloy Metals Company

562-941-1616
www.alloymetalsco.com
Moe@alloymetalscompany.com; Steven@alloymetalscompany.com; Anju@alloymetalscompany.com

Alloy Metals Company is a full service distribution center with offices located in Southern California, New York and Wichita, KS (opening 2019). AMC specializes in Titanium Bar, Sheet & Plate products.

Offering quick turnaround and in-house cut to size parts, AMC is your one stop destination for your Titanium raw material needs.

Industries Serviced: Aerospace, Oil & Gas, Nuclear, Medical and Industrial markets.

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- 6AL-6V-2SN
- 6AL-2SN-4ZR-2MO
- 6AL-2SN-4ZR-6MO
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- 10V-2FE-3AL
- 3AL-2.5V
- 15V-3AL-3CR-3SN

AMC is AS9100D/ISO9001:2008

American Prosthetic Components

American Prosthetic Components is a manufacturer of prosthetic components.

American Titanium Works LLC

+1-603-398-3342

American Titanium Works LLC is completing plans to build a new, green-field, integrated, world-class titanium manufacturing facility in the southeast of the United States. ATW is targeting the defense, industrial, commercial, consumer and emerging markets with a range of products and services including alloy and commercially pure titanium plate, bloom, billet, slab, and ingot.

Applications for our products will include defense ballistics and general military equipment construction, chemical processing equipment, oil & gas systems, pulp & paper production facilities, medical implants, and a wide and growing range of consumer goods.

AmeriTi Manufacturing Company

1-313-366-5300
www.AmeriTi.com

AmerTi Manufacturing Company is a leading producer of ferrotitanium, titanium scrap products, and titanium HDH powder. Located in Detroit, Michigan, AmeriTi serves the steel, stainless steel, aluminum, and titanium industries. AmeriTi is an ISO 9001:2008 registered company with a strong commitment to safety, quality, and customer service.

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Arconic (NYSE: ARNC) creates breakthrough products that shape industries. Working in close partnership with our customers, we solve complex engineering challenges to transform the way we fly, drive, build and power. Through the ingenuity of our people and cutting-edge advanced manufacturing techniques, we deliver these products at a quality and efficiency that ensure customer success and shareholder value. For more information: www.arconic.com. Follow @arconic: Twitter, Instagram, Facebook, LinkedIn and YouTube.

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India's leading Stockholder of Titanium, Nickel Alloys & Stainless Steel Mill Finished Products, Re-Usable & Scrap.

ARIES Manufacturing

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ARIES Manufacturing: ARIES Manufacturing, formerly marketed as The Cyril Bath Company and ACB Company, is part of an International corporation known as the ARIES Alliance. This group of aerospace focused businesses provides innovative metal forming and joining solutions to the aerospace industry. The foundation of its technologies is stretch forming of aluminum alloy sheet for fuselage skins, as well as aluminum and titanium profiles for airframe structure components. The company's stretch presses are equipped with the latest CNC control systems, designed and developed by its in-house software engineers. Our stretch forming customers include the leaders in commercial and business aircraft manufacturing, in addition to their complete supply chain network. ARIES Manufacturing has developed a very innovative Hot Stretch Forming process, or HSF®, to contour titanium profiles for airframe component applications. This high temperature forming process precisely stretch forms titanium extrusions to the exact part design contour. The hot stretch formed part is then machined and finished into a critical airframe component. This valuable forming process saves starting titanium weight by offering a near net profile solution; contoured in a controlled, repeatable process, with minimal residual stress. In addition, under ARIES Manufacturing, we hot form and superplastic form titanium sheets for applications in nacelle and pylon components. Our facility in Nantes, France operates 12 hot forming/Superplastic Forming presses of varying sizes. Additionally, we can laser or machine trim, spot weld, hot brake form, and perform assembly work. All of our hot presses are designed and built within our corporation businesses. Finally, ARIES manufacturing has a facility in Grenoble, France that can perform pocket milling and final trimming on large aluminum alloy fuselage skins. This contract manufacturing work utilizes our internal expertise and design engineering of a very innovative "mirror milling" type CNC machining center. Tel: +1 704-289-8531 • www.aries-manufacturing.com

ATI

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www.ATImetals.com
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ATI is a global manufacturer of technically advanced specialty materials and complex components. ATI is a market leader in manufacturing differentiated products that require our unique manufacturing and precision machining capabilities as well as our innovative new product development competence. Our capabilities range from alloy development to final production of highly engineered finished components, as well as producing powders for use in next-generation jet engine forgings and 3D-printed aerospace products. ATI offers our customers a unique supply chain solution that Creates Long-Term Value Thru Relentless Innovation®.

Avon Metals Ltd.

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Avon Metals is a manufacturer of aluminum products and a recycler of specialty metals.

We make high purity aluminum pellets/shot for the Titanium Industry.

Specialty metals and scraps processed/traded included CP Titanium, 6/4 Titanium, Molybdenum, Zirconium, Tantalum, Vanadium, Chromium.

We are buyers/consumers of off grade Vanadium-Aluminum type alloys in lump and powder forms.

BAHCO

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Bahco's 3860 Multi Chip Carbide bandsaw blade has been developed specifically for cutting Titanium Alloys. The 3860 Multi Chip Carbide blade improves and optimizes Bandsaw operation with a World leader in Cutting Technology. In the 1980's Bahco developed and Patented the first "Set Tooth" Carbide Bandsaw blade to provide fast, efficient cutting of exotic alloys and have led the way in this sector ever since.

Bahco is a registered trade name of Snap-on Incorporated a leading global innovator, manufacturer and marketer of tools, diagnostics, and equipment, software and service solutions for professional users. Products and services are sold through the company's franchisee, company-direct, distributor and Internet channels. Founded in 1920, Snap-on is a $2.8 billion, S&P 500 Company headquartered in Kenosha, Wisconsin. Our Mission - The most valued productivity solutions in the world. Snap-on Incorporated P.O. Box 1410 Kenosha, WI 53141-1410, U.S.A. 262-656-5200.

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Banner Medical Innovations (BMI) specializes in providing complete singlesource cold finished bar, plate, sheet and supply chain solutions for the medical, dental, and aerospace industries. We carry over 1 million pounds of raw and finished goods inventory to service our customers quickly. Our complete offering of stainless, titanium, aluminum, alloy, cobalt chrome and cannulated products coupled with unique value-added services sets BMI apart. Some of these unique value-added services include:

- Custom supply chain management solutions
- Complete traceability from melt source to finished product
- In-house Ultrasonic (UT) Testing
- Vendor managed inventory (service) and JIT programs
- Line marking
- Niton Gun material analysis
- Near-net shape machining/Blanking
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Quality Throughout
Each BMI facility is ISO 9001: 2008 certified. Medical production facilities are ISO 13485:2003 certified. Our Carol Stream facility is also AS9100C: 2009 certified

Baoji JHY Titanium Industry Co., Ltd

+86-917-3372996
stella@ti-bolts.com

Baoji JHY Titanium Industry Co., Ltd was founded on 25-09-2002. It is a professional manufacturer for titanium and titanium alloy fasteners and machined products. We can produce them according to different standards, like GB, ISO, DIN, ANSI and JIS etc. They are widely used in petroleum, metallurgy, chemical, pharmacy, marine engineering, racing car, motorcycle, bicycle, yacht, outdoor camping and sports equipment.

Our company insist the "Quality First" strategy rather than "Low priced" one to earn trust from customers, which has been proved correct after 15 years in this industry. Now over 85% our products are exported to Japan, United States, United Kingdom, Germany, Netherlands and other European countries.

Baoji Titanium Industry Co., Ltd.

+86 917 3382 075
www.baoti.com
iedept@baoti.com; sunyuwei@baoti.com

Baoji Titanium Industry Co., Ltd (Baoti) is the biggest manufacturer of titanium mill products and titanium alloys in China. An integrated production system that includes melting, forging, rolling, drawing and fabricating enables Baoti to manufacture various products such as titanium sponge, ingot, billet, bar, wire, plate, sheet, tubing, forging, casting of all grades of CP titanium and most titanium alloys as well as many down-stream products in accordance with AMS, ASTM, MIL, ASME, ISO, DMS, AWS, JIS specification. These products are widely used in every kind of industry ranging from aerospace and automotive to sports, medical, chemical and petrochemical industries. Baoti is an ISO9001 and NADCAP approved company.

BAOWU Special Metallurgy Co., ltd.

+ 86-21-26032635
www.baosteel.com
dingchen@baosteel.com

Baowu Group is the largest and most advanced integrated steel company in China. BAOWU Special Metallurgy Co., ltd. is a subsidiary company of Baowu Group. BAOWU Special Metallurgy Co., ltd. grew out of Shanghai No. 5 Steel Works, and started manufacturing of titanium alloys since 1968. The main titanium products include: ingot, billet, bar, coil, stock, isothermal forging and so on.

BHN Special Materials Ltd.

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BHN special Materials Ltd. is a leading high quality master alloy producer in Dalian, P.R. China. BHN is certified according to EN9100:2009 and ISO 9001:2016.

BHN provides the full range of Vanadium, Molybdenum, and Niobium containing binary alloys for the Titanium Industry for aviation, military, and medical application in China and abroad.

The expertise of BHN is to supply tailor-made multinary master alloys well designed to simplify the customers' manufacturing process to improve their competitiveness.

To learn more about BHN, please visit our website at http://www.bhn-materials.com/.

BIBUS METALS

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BIBUS METALS Group is 100% Swiss owned, and since 1979 a leading distributor and stockholder of Titanium (CP and Titanium alloys) as well as Nickel based alloys, Cobalt-Chromium and 316LVM (1.4441) in Europe and Asia. BIBUS METALS Group is a supplier for different applications in medical, chemical, aerospace, automotive, oil & gas, power generation industries and offers:

Sheets/Plates, Wire/Bars, Tubes/Pipes, Strip/Foil, Welding wire, Screw/Nuts, Profiles

The fully integrated Service Centres are located in Switzerland, Germany, Czech Republic, Poland, Hungary and China to ensure reliable and rapid service for customers worldwide.

Where necessary the entities of the Group are certified according ISO 9001, EN/AS 9120 for aerospace and EN ISO 13485 for medical. Quality, flexibility and tailored solutions are of great importance for the whole BIBUS METALS Group.

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Hempel Special Metals provides the optimum solutions for the demanding medical industry where material and services for implants and instruments are required.

Our Swiss Service Center is ISO 13485 certified and has been approved by the leading OEMs.

We are able process the material on our in-house water jet- and laser cutting machines, as well as chamfering, turning and bar marking equipment.

We support you locally and globally in optimising your internal processes.

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Blaser Swisslube AG is an independent and family-owned Swiss company founded in 1936. Blaser Swisslube is represented in more than 60 countries on all continents. The company develops and produces high-performance cutting fluids for customers who manufacture tiniest to large titanium components as well as critical and structure components, particularly for aerospace and medical. Blaser Swisslube's goal is to optimize manufacturing processes and to improve their economic efficiency, productivity and machining quality. In close cooperation with the customers Blaser Swisslube presents new solutions to fully exploit the potential of machines and tools by using the right metalworking fluid which becomes a liquid tool. This promise is backed by excellent products, customized services, competent experts and its long experience in the metalworking industry. For more information please visit www.blaser.com.

Bodycote

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With more than 180 locations in 23 countries, Bodycote is the world's largest provider of heat treatment and specialist thermal processing services. Through heat treatment, metal joining, surface technology and Hot Isostatic Pressing (HIP), Bodycote improves the properties of metals and alloys, extending the life of vital components for a wide range of industries, including aerospace, defense, automotive, power generation, oil & gas, construction, medical and transportation. Customers in all of these industries have entrusted their products to Bodycote's care for more than 30 years. Bodycote is the vital link for additive manufactured titanium components, providing property improvement through HIP and heat treatment post processing services.

Buehler

1-847-295-6500
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Buehler is a premier global manufacturer of metallographic equipment, Wilson hardness testers and supplies for sample preparation and microscopic analysis. Buehler has a team of material scientists and Buehler Solutions Centers that solve some of the most challenging problems and improve processes.

Buehler's goal is to have the most intuitive, efficient and reliable equipment and high performing consumables through customer backed innovation.

Being a part of ITW a Fortune 200 company, Buehler has made significant investments in R&D that allows for continuous innovations that meet the needs of industrial manufacturers and suppliers.

Butech Bliss

330-337-0000
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Butech Bliss is a designer and manufacturer of capital equipment, repair components and engineering and field services for metals producers and processors that roll, forge, melt, flatten, stretch, shear and extrude metals of all types. Butech Bliss is located in Salem, Ohio and is home to one of the largest manufacturing facilities in the industry. With over 50 engineers on staff, 400,000 sq. feet, 100+ machining centers, full fabrication and assembly departments, 200 ton crane capacity and a dedicated rail spur, Butech Bliss is equipped to handle any project. Butech Bliss product offerings include copper crucibles, liners, molds, hearths, etc. for VAR, ESR, PAM and EBM Re-melting equipment as well as Rolling Mills, Forging and Extrusion Press upgrades and Coil, Plate and Sheet processing equipment for all metals. Butech Bliss is comprised of Butech Inc., E.W. Bliss (Bliss-Salem), Loewy Machinery and Lombard Industries.

Calvi Holding S.p.A

+39 039 331071
www.calviholding.it; www.calvinetwork.com
contact@calvinetwork.com

Born from the aggregation of multinational entities with over 700 years of combined experience in the engineering and manufacturing of special steel profiles based on customers' specifications, Calvi Holding S.p.A. owns controlling stakes in 12 manufacturing companies operating in the metallurgical and mechanical industries.www.calvinetwork.com

The group's operations are organised into two divisions: the metallurgical division, which specialises in manufacturing special steel & titanium profiles based on customers' specifications with hot and cold forming technologies, and consists of the 9 companies in the Calvi Network Special Steel Profiles and the diversified mechanical division, made up of 3 companies that manufacture lifting units for forklifts.

The Network, which boasts a long history of manufacturing steel and a world-class know-how, presents itself as a partner for the manufacturing of special sections for countless applications in a wide range of industrial segments, including energy, aerospace, medical, automation, and machine tools, and addresses the growing needs of the market for forming solutions.

Carbolite Gero

Carbolite Gero Business Unit Manager: Michael Hager
(920) 567-0024
www.verder-scientific.com
info-us@verder-scientific.com

Carbolite Gero, part of Verder Scientific, has 80 years of experience and a reputation for quality and reliability, which are invaluable in the aerospace industry. Furnaces and ovens from Carbolite Gero are the first choice for many of the aerospace industry's most respected companies for the heat treatment of aircraft components. Equipment is available for both initial manufacture and MRO (maintenance, repair and overhaul) to AMS 2750E within a Nadcap environment. Carbolite Gero products are already widely used by leading aerospace manufacturers and as a result we are able to offer excellent references.

Producers, Distributors, Fabricators, OEM's, & Vendors to the Industry

Carpenter Technology Corporation

610-208-2000
www.cartech.com
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Carpenter Technology Corporation (NYSE: CRS) is a recognized leader in high-performance specialty alloy-based materials and process solutions for critical applications in the aerospace, defense, transportation, energy, industrial, medical, and consumer electronics markets. Founded in 1889, Carpenter has evolved to become a pioneer in premium specialty alloys, including titanium, nickel, and cobalt, as well as alloys specifically engineered for additive manufacturing (AM) processes and soft magnetics applications. Carpenter recently expanded its AM capabilities to provide a complete "powder-to-part" solution to accelerate materials innovation, offer rapid prototyping, and streamline parts production. www.cartech.com. On social: Twitter, LinkedIn, and Facebook

CEFIVAL SA - SIDERVAL S.p.A

CEFIVAL +33 1 39 37 12 25; SIDERVAL +39 342 67 41 11
www.cefival.fr; www.siderval.it
commercial@cefival.fr; siderval@siderval.it

CEFIVAL and SIDERVAL manufacture special sections and tubes with hot extrusion process to obtain near net shape profiles. The engineered shapes are studied and manufactured according to customer's requirements in a wide range of solid and hollow sections. Our manufacturing process improves the buy to fly ratio. Main grades are titanium, inconel, stainless and carbon steel, super alloys, nickel alloys and other on requirement. Main application fields are aeronautics for aircraft ring engines (CFM56, GE90, GP7000, CF6-80, SM146, Gen X) and structural parts (such as seat tracks, floor and wings stiffeners, door hinges…), power generation for nuclear (ia drive rods) and conventional applications, architecture, defense, medical and food industry. Cefival is NADCAP certified.

Chaoyang Jinda Titanium Co., Ltd.

+86 421 2976177
www.jinda.cc

Chaoyang Jinda Titanium Co., Ltd.(Jinda Titanium)was founded in August, 2006.The main products are Jinda brand titanium sponge(famouse brand products in Liaoning Province) and titanium ingot and other processed products. Production ability per year for titanium sponge is 10,000 tons, for ingot is 2000 tons and 40,000 tons for anhydrous magnesium chloride.

Jinda Titanium is the National High-tech Enterprises with unique production technology, advanced inspection instruments and strong technical force. Jinda Titanium passed ISO9001 Quality Management System,ISO14001 Environmental Management System, GB / T28001 Occupational Health and Safety Management System, GJB9001B Military Standard Quality Management System, AS9100C Aerospace Quality Management System Certification and ISO / IEC17025 National Laboratory Accreditation.

The quality of Jinda titanium sponge is stable. Self R & D MHT-90 high-quality titanium sponge and small size titanium sponge have become the preferred raw materials of aerospace and defense, marine engineering and other high-end usage of titanium industries.

Jinda Titanium is a member of the International Titanium Association, the vice managing director of Chinese non-ferrous metal industry association titanium zirconium Hafnium Branch, the vice managing director of Titanium Industry Progress and the director of Baoji Titanium Association. Jinda Titanium comprehensive ranks forefront in titanium industry.

Chesapeake Industrial Cleaning Products, Inc.

+1-410-340-9052
www.chesapeakeindustrial.com

Chesapeake Industrial formulates and supplies manufacturing chemicals and degreasers to titanium recyclers and processors. Cleaners for removing oil from turnings, dirt and oil from scrap, cutting fluids from formed products and other typical operations are our expertise. Chesapeake provides a wide range of formulated products from general cleaners to high spec materials made at facilities in several US locations. Products specifically designed for individual operations can be formulated for costs often lower than 'off-the shelf' materials. Chesapeake has served customers in the titanium industry for over 10 years. Drums, Totes and Bulk deliveries of materials are all available.

China Huaxia Special Metal Limited

0086-21-58770128
www.nonferrous-metal.com; www.csmhuaxia.com
helen@nonferrous-metal.com; csm@nonferrous-metal.com

China Huaxia Special Metal Limited is one of the largest manufacturers of titanium, nickel & nickel alloy, stainless steel/duplex & supper duplex with forms at sheet/plate, seamless tube/pipe, bar/rod, wire, welded pipe, seamless & welded fitting, flange, valve, clad material etc. With the logo CSM (China Special Metal), we hope to be the best one of special metal manufacturer in China. CSM always treat the quality as our life, CSM invest the quality and future. CSM material have been widely used in oil & gas industry, chemical industry, construction industry, sports industry etc, many big companies in these field have approved CSM material. CSM took the pride in CSM titanium sheet used in 2012 London Olympic Village decoration, CSM has the mission to be the enterprise to improve the position of Chinese titanium products in the international market.

China Steel Corporation

+886-7-802-1111
http://www.csc.com.tw/csc_e/pd/mlg/mlg.html

China Steel Corporation provides high quality titanium products, including ingot, plate, sheet, bar, wire coil and tube, for a wide range of applications in architecture, chemical industry, heat exchangers, copper foil facilities, fasteners, desalination, electronics, sports industry, leisure and moving forward to biomedical and aerospace application.

The stable and reliable quality of CSC's titanium products have gained the acceptance of Asia industries widely, and CSC has also been selected as the first priority provider to purchase their needed titanium materials owing to CSC's quick and efficient technical services. CSC will continue to improve customer services and the technical technologies both for customers and CSC itself to promote Titanium Alloy products' international competitiveness.

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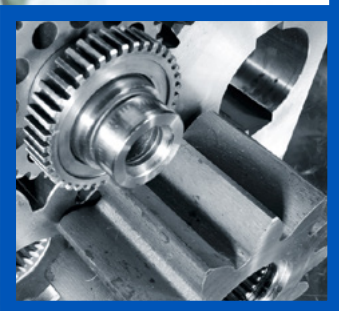

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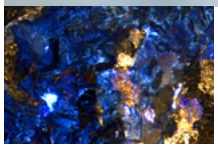

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CMI Group designs, integrates, modernizes and maintains equipment for industries like energy, defense, metals, environment, and transport and industry in general.

Present on all five continents, CMI numbers more than 5,500 experienced employees who combine technological expertise and the management of international projects.

As such, CMI has supplied innovative heat treatment technologies, combining field proven reliability and cutting edge technology for every application since 1923.

Grounded on the experience of well-known brands like Electric Furnace Company (EFCO) and French ATI Furnace, CMI Industry provides heat treatment products to process a wide range of materials in a multitude of sizes, shapes and thermal cycles.

Based on its great historical knowledge and evidenced by numerous worldwide references, heat treatment products supplied by CMI comply with local, national and international safety and quality standards, including: NFPA 86; NEC (NFPA 70); UL508a; AMS 2750; NADCAP.

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Consarc Corporation, an Inductotherm Group Company, is a manufacturer of vacuum furnaces for the titanium forging and casting industry. Consarc custom designs and manufactures Reactive Vacuum Arc Remelting (RVAR) furnaces for primary electrode melts of compacted sponge titanium and titanium alloys, and secondary melt furnaces for remelting fully dense electrodes. Consarc also designs and manufactures fully customized Induction Skull Melting (ISM) systems for melting titanium in a refractory free environment for casting or ingot withdrawal. Consarc is ISO 9001-2008 certified, and with operations on 5 continents, is well equipped to tackle fully customized furnace projects globally.

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Continental Steel and Tube Company is one of the world's leading value added volume suppliers of quality metals. With an outstanding global reputation, our team of expert sales associates can supply a comprehensive inventory of metals to meet any application requirements.

Continental Steel supplies a wide range of metals including, titanium, stainless steel, nickel, steel, aluminum, hot/cold rolled, galvanized, and stainless and electrical steel in carbon and alloy grades. Our long list of Titanium Grades includes CP4 Gr1, CP3, Gr2, CP2Gr3, CP1 Gr4, Gr7, Gr5 Ti 6AL-4V, Gr6, Gr9, Gr 12, , Gr 19 (Beta C) & Gr 11. Our materials are available in coils, sheets, strips, plates, angels, bars, rounds squares, hexagons, and other custom shapes. Continental also offers tubing or pipes in welded, DOM and seamless.

Coogee Titanium Pty., Ltd
www.coogee.com.au

Coogee Titanium is a division of Coogee Chemical, a long-established privately held chemical business headquartered near Perth, Australia. Titanium R&D is based in the Melbourne, Australia area. Coogee has leveraged their chemical engineering expertise to advance a Kroll-like process for the continuous production of titanium and titanium alloy powder to production. A production facility with Gen 4 equipment is being built in Kwinana, Western Australia, Coogee Chemicals' headquarters and a major operations facility. The production plant will focus on the production of Ti 6-4 low oxygen powder for additive manufacturing, MIM, and other advanced manufacturing applications. Alloy development will remain in Melbourne.

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Founded in 1976, Cosen is one of the world's leading band saw manufacturers with a broad product line and a global sales network including Cosen USA and Cosen Europe. Cosen's North American office and warehouse is located in Charlotte, NC. From there, the company provides an extensive selection of service replacement parts and local machine technicians. Our warehouse inventory contains over 100 new machines in stock and ready to ship at all times.

Cristal Metals Inc.
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itp.billing@cristal.com

Cristal Metals was formed in 1997 as International Titanium Powder (ITP) to develop and commercialize Armstrong Process® patented and proprietary technology for high purity metal and alloy powders with specific emphasis on titanium. Powders produced through the Armstrong Process® can be used as spheroidization feedstock for additive manufacturing to provide customized compositions. Powders may also be employed to manufacture parts through direct consolidation to lower processing costs for titanium parts via powder metallurgy processing.

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CSIRO Metal Industries Research Program

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https://www.csiro.au/en/Research/MF/Areas/Metals
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The Metal Industries (MI) Research Program is engaged in applied research across the metal value chain, specialising in novel metal production techniques, interfaces/corrosion, energy systems, metal forming, and additive manufacturing / 3D printing, particularly for Titanium and its alloys. Strong Multiphysics modelling techniques are combined with practical experimentation to understand and develop advanced solutions for Australia and the global industry. MI undertakes independent and collaborative research, and partners with industry and academia around the world. MI also provides consulting services, use of specialized facilities, and additive manufacturing training to Australia's Manufacturing Industry, including through its 'Lab22 Additive Manufacturing Innovation Centre'. The Commonwealth Scientific and Industrial Research Organisation (CSIRO) is Australia's primary national research body, with over 5,000 researchers active over a wide range of fundamental and applied research challenges.

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http://cumberlandhighstreet.com

Cumberland Highstreet Partners provides executive leaders access to a team of proven, experienced professionals who possess a deep domain knowledge of manufacturing. Services include Strategic Planning, Mergers & Acquisitions Assessments, Executive Leadership Mentoring, Supply Chain Optimization and Commercial Strategies.

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DANOBAT focuses on the design, development and manufacture of machine tools, high value-added production systems and fully flexible solutions, adapted to our customer's needs.

Internationalization has been an ongoing process. Therefore DANOBAT has production plants and service centers in Spain, Germany, UK, USA and Italy, as well as an important sales and service network which covers 40 countries.

Innovation is one of DANOBAT's hallmarks since it started its activity 65 years ago. Among its wide range of innovative solutions, DANOBAT offers its latest developments of customized solutions for the most stringent cutting processes. The latest technologies are utilized to achieve the highest rigidity and precision.

DANOBAT machines provide an ergonomic and high-end solution with a user-friendly and powerful software, and provides cutting edge sawing solutions.

DANOBAT supplies sawing solutions to customers demanding the highest technological requirements, in aerospace, oil & gas, forging industry, energy, mold and die, automotive, steel manufacturers.

DANOBAT is part of the DANOBATGROUP, the machine tool division of the Mondragon Corporation. With a turnover of 260 million euros and 1300 people, it is one of the main Machine Tool and production system manufactures in Europe.

More info, please visit us at: www.danobatcuttingsolutions.com

Design Group

253-926-0884
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Design Group brings a broad and extensive depth of engineering and operating experience in titanium to work for you. With our expanded resources, and our understanding of the critical requirements of the RG/PG world opens the door for us to benefit your organization. Our experience and ability to assist across all facets of an operation, including sponge, sponge processing, scrap and scrap handling, scrap processing, blending, melting, finishing, flattening, and other operations, allows for integrated, comprehensive solutions.

We can partner with you to Optimize Processes and assist with reviews of your operations in regards to RG/PG standards and expectations. We will utilize our experience to upgrade or replace equipment to improve or increase your production capabilities. We can provide Facility Audits, Feasibility Studies, FEED Studies, and Detailed Engineering for new process and manufacturing facilities, including the integration of your control and data systems for reporting, chronological documentation and MIS reporting. And, we can audit your processes against industry quality standards and provide paths for continuous quality improvement.

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For over 12 years, Direct Alloys has been offering a unique concept for the specialty metals industry. The industry now has access to a dedicated online clearinghouse for excess prime superalloy, titanium, specialty steels and aluminum forging stock, machining bar, plate, wire, tubing, sheet and strip inventories. Our goal is to improve the communication between short term material supply and demand, saving purchasers and suppliers precious resources of time, energy and capital. By concentrating on a limited range of materials we believe the company provides a unique knowledge based service to the marketplace. The Direct Alloys website, database and advanced sales tools offer a dynamic value added service for suppliers and consumers of high performance metals.

Duferco SA

+41-91-8225600
www.dith.com

Duferco Group is the ultimate shareholder of Vanchem Vanadium Products. (Pty) Ltd "Vanchem" and acts as its only distributor.

In 2016 Duferco SA has also taken up a long-term distributorship agreement for vanadium products from Chengde Steel HBIS "Chengde."

Chengde is an integrated steel and vanadium producer. Chengde vanadium products range include FeV50%, FeV80%, as well as standard and high-purity vanadium oxides and vanadium carbide nitride (VCN).

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Edge International, located in Dayton, Ohio, is an ISO 13485-certified stocking distributor of raw materials, specializing in medical grade Cobalt-alloys, Stainless Steels and Titanium for the manufacture of implants and instruments for the orthopaedic, spine and trauma markets. Edge works with its customers to provide cost-effective solutions and concentrates on the medical market to ensure the highest level of compliance, quality and service. Value-added services include precision grinding to size and tight tolerances, precision sawing, non-standard grades and sizes, and just-in-time inventory programs. Edge conducts business internationally, supplying to customers around the globe.

ELG Utica Alloys, Inc.

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EUA is one of the world's largest Titanium, Nickel and Cobalt alloy recycling companies. We operate under the tightest quality standards, utilize the latest equipment, offer unparalleled service, are fed by over 40 sister yards worldwide and have the financial backing of ELG Haniel GmbH.

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Eltra Elemental Analyzers, part of Verder Scientific, plays a key role to ensure that desired properties of the materials used in the construction of airplanes are met. Such material is subject to rigid testing and comprehensive quality control. This includes for example elasticity or the protection from embrittlement. ELTRA GmbH has over 30 years of experience in manufacturing of elemental analyzers for the determination of Carbon, Sulfur, Nitrogen, Oxygen and Hydrogen content, in metals and powders, with some of the analyzers specifically optimized for applications in the aerospace industry.

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www.fae.com.ar
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FAE is an Argentinean company qualify for supplying hydraulic Ti-3Al-2.5V tubing for A320 family being the first Latin-American company in getting a tier one contract with Airbus. One of its main activities, apart from aerospace, is the manufacturing of seamless commercial pure titanium and titanium alloy tubes, straight or U bend for heat exchangers and instrumentation. The nuclear business is the origin of the company and the Zirconium cladding tubing for the nuclear fuel elements constitutes the main product of the company. It also produces nickel alloys 690 & 800 tubes for nuclear steam generators up to 35 meter lengths.

FAE is certified according to UNE EN 9100: 2016, ISO 9001: 2015, ISO 14001: 2015, OHSAS 18001: 2007, PED 97/23/EC & CSA N 285.0.

FE Mottram Ltd

+44 1142446723
www.femottram.com

Founded in 1973 FE Mottram Ltd is one of the pioneers of eutectic ferro titanium manufacturing in the UK. Over 45 years later Mottram is more than ever one of the leading ferro titanium producers.

Based in 'Steel City' Sheffield, FE Mottram enjoys a strong reputation as an ISO 9001: 2015 accredited manufacturer of both standard grades and tailor-made high grade ferro titanium serving the most demanding customers in the steel industry worldwide.

Fine Tubes | AMETEK Specialty Metal Products

+44 (0)1752 876416
www.finetubes.com
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Fine Tubes, part of AMETEK Specialty Metal Products, is a leading global manufacturer of precision tubing in high performance titanium, stainless steel and nickel alloys.

The company manufactures tubes in both seamless and welded forms used in mission critical applications across a range of specialty markets including aerospace, oil and gas, nuclear and medical.

TITANIUM TUBE EXPERTISE

- Seamless titanium tubes from 1 mm (0.040 in) OD to 45mm (1 5/8 in) OD
- Straight lengths up to 5.5 metres (18 ft.)

TITANIUM ALLOYS

Fine Tubes offers a comprehensive portfolio of titanium tubing in the following alloys:

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The tube mill has achieved NADCAP approval for Ultrasonic Testing, Heat Treatment, Fusion Welding, Chemical Processing and Fluid Distribution Systems.

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Based in the United Kingdom, Fine Tubes operates several state-of-the-art titanium processing facilities including:

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- Chemical Processing
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Our metallurgical and engineering experts are ready to support your teams in developing competitive solutions for your most demanding technical challenges.

Fine Tubes, Reading Alloys Superior Tube, Hamilton Precision Metals, AMETEK SMP Wallingford and AMETEK SMP Eighty Four– all leading manufacturers of advanced metallurgical products – form AMETEK Specialty Metal Products.

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Extrusion, Rolling & drawing of hollow bars in specialty metals, mainly used in the orthopedics, cutting tools, nuclear, energy and aerospace.

HSS, tool steels, titanium alloys, maraging and PH alloys, as well as Hf & Zr alloys.

Fort Wayne Metals
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Fort Wayne Metals has a long history of producing precision titanium bar, wire and wire-based components for demanding applications. For many years, our efforts focused exclusively on the medical device industry. But our skills are just as valuable in many other critical applications.

After all, we understand the critical importance of quality: our employees have experience producing materials for applications designed to save lives. We uphold the highest quality standards throughout our production process – beginning with melting material in our own furnace. We are 9100C and ISO 9001 certified, and maintain a A2LA - ISO/IEC 17025 compliant Materials Testing Laboratory.

Available diameters:
- Wire: 0.001" (0.0254 mm) to 0.062" (1.5748 mm)
- Coil: 0.040" (1.016 mm) to 0.500"(12.70 mm)
- Bar: 0.0787" (2.0 mm) to 3.000" (76.20 mm)

Available grades:
- Commercially pure Titanium (ASTM F-67 • ASTM B348 • ASTM B-863 • ISO 5832-2)
- Grades 1 - 4
- Alloyed Titanium
- Ti-6Al-4V ELI (ASTM F-136 • ASTM B-348 • ASTM B-863 • ISO 5832-3)

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GfE, founded in 1911 and being part of AMG Advanced Metallurgical Group N.V., is a leading manufacturer and global supplier of high performance metals and materials.

We offer a wide range of high-quality master alloys that meet the highest technical requirements for different specialized sectors, mainly aerospace, super alloy industry and ship-building.

Furthermore titanium as high-purity HDH powder is produced by GfE for thermal spray coatings. Its specific characteristics offer an advantageous material for porous layers on medical implants.

Our product spectrum is completed by inter-metallic Titanium Aluminum light weight alloys, known as gamma Titanium Aluminide alloys. Its present applications include low pressure turbine blades (LPT) for civil aircraft engines as well as turbocharger wheels for the automotive industry.

GfE is certificated in accordance to ISO 9001, EN 9100, ISO 14001, ISO 50001 as well as BS OHSAS 18001 and operates an accredited laboratory according to DIN EN ISO/IEC 17025.

The National Association of Manufacturers is warning that 2.4 million manufacturing jobs could go unfilled between now and 2028, according to a study from the association and the consultancy firm Deloitte. We recognize that seeds need to be planted at a young age in children to consider STEM careers. Kids in Titanium is offering an amazing opportunity for ITA Member organizations interested in engaging with their communities.

Last fall at the Las Vegas convention, ITA hosted 75 students (ages 11-14) from local metropolitan schools interested in learning more about titanium metal. ITA Members volunteered their time to host the tabletop displays and the ITA worked with science teachers to create age appropriate curriculum. Students and science teachers learned how titanium is made, what industries currently use the metal,

Click here to view the Kids in Titanium segment from Las Vegas.

the ITA led an anodizing station where students colored their own piece of scrap and ITA handed out information about academic scholarships available and the women in titanium programming.

We understand, particularly as parents ourselves, you have to plant the seeds in young people to get them thinking about their futures. If you want them to be inspired to be a chef, you have to teach them how to cook. If we want youth to consider joining the titanium industry in their adult careers, we have to introduce them to the industry, plant those seeds at a young age so when they are ready to think about college, those who decide to study STEM fields may think again about that day when the titanium industry introduced them to the wonders of titanium metal.

If your organization is interested in hosting a Kids in Titanium event at a local school in your community, please contact us. We would be pleased to bring all the materials with us and we can help organize volunteers or your company may supply the volunteers to help man the tables. It's a great way to support STEM in your community and many local newspapers and news channels report of these types of events so your company could be recognized.

To learn how your company may be included in this series, contact **Ashleigh Hayden**, ITA Sales Director at **ahayden@titanium.org** or **1-303-404-221**.

International Titanium Association

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Goldman Titanium, Inc. purchases and processes scrap titanium in order to supply the highest quality finished product to our customers. As a pioneer in the titanium industry, our company was first established in 1958, and we have continuously expanded our business over the years. Titanium is the only metal we handle, making us experts in our field.

Goldman Titanium is certified to AS9100D with ISO 9001:2015, complying with the rigorous requirements of the aerospace and defense industries. Our company's products have been approved by major U.S., European, and Asian melters, as well as by master alloy producers, steel and stainless steel producers, and ferro titanium producers.

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GRANDIS TITANUM is an ISO 9001:2008 certified worldwide supplier of titanium products like Titanium Bars, Sheets, Plates and Wire for the Industrial, chemical and Additive Manufacturing / 3-D printing industries. Company maintains warehouses in Los Angeles and Rotterdam, and USA sales offices in California, Ohio and Oregon. We also have sales offices in South Korea, China, Russia, Belgium and Italy.

Haynes International Inc.
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Haynes International, Inc. is one of the world's premiere manufacturers of titanium tubing. HAYNES® Ti-3Al-2.5V alloy is used for aircraft hydraulic systems. Our seamless Grade 9 titanium tubing is produced to many industry specifications, including AMS 4943, AMS 4944, AMS 4945, AMS 4946, AS5620, SB 338/B 338Gr9 and UNS R56320. Additionally, Haynes is a leading developer, manufacturer and distributor of high-performance HAYNES® and HASTELLOY® nickel- and cobalt-based alloys used in corrosion and high-temperature applications.

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Hempel Special Metals Group is distributor for Titanium, Nickel Alloy and Zirconium from stock. Our companies with Service Centers are located in Switzerland, Germany, UK, Poland and Hong Kong/China and sales representatives in Italy, and Ireland. We have competence centers for the chemical process, the oil & gas, the aerospace, the medical and the watch industry. Beside all standard titanium grades we stock special grades (Grade 4, 5, 5-ELI, 7, 9) in bars, sheet/plates and tubes. Our services include individual stocking, cutting, sawing, plasma, laser- and water jet cutting, individual bar marking and turning. We supply material tailor made and in packages for special projects. On our Metal Exchange Econoxx.com you can buy and sell titanium a.o. material.

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Incorporated in 1982.

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Hoeganaes Specialty Metal Powders engineers gas-atomized metal alloy solutions for the aerospace, medical, and automotive industries. Located in Cinnaminson, New Jersey, USA, Hoeganaes Specialty Metal Powders provides complete support and consistent quality required to meet the most demanding applications. AncorTi Ti6Al4V and commercially pure Ti are available in a range of particle sizes and purities including those that meet ASTM specifications. Additional alloys have been developed to encompass even more demanding characteristics needed beyond standardized product lines. Qualified powders are ideal candidates for additive manufacturing and applications used in the aerospace, chemical, marine, and medical industries. Contact our technical sales lead to learn more about what we can offer you.

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IFA is a premium supplier of high integrity titanium forged products to quality markets globally. Our specialist forgings include seamless rolled-rings, forged discs, forged shafts and forged bars which are used as the near net shape raw material for subsequent finish machining to a wide range of components.

We have created a fully integrated metals service centre which has grown to be a leading provider of quality open-die forgings used for safety critical components to operate in severe service conditions.

We participate in the high technology markets of Aerospace, Energy, Oil and Gas and Power Generation (including Nuclear) and high-end Advanced Engineering.

Our flexibility and scale of operations means that we can provide both highly specialised "one-off" forgings as well as volume production and meet customer deadlines for delivery. Hirework, or toll forging, of customer owned material is also offered.

Located in Sheffield, UK for over 250 years, our plant is an ISO 9001, AS 9100 D, ISO 14001, OHSAS 18001, Lloyds Register of Shipping & NADCAP Metals Manufacturing, Heat Treatment, Testing and Inspection accredited facility, ensuring we meet exacting customer quality expectations.

We firmly believe that "forging partnerships" between IFA and our clients is vital for the 21st century and its demands.

Inductotherm Corp.
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www.inductotherm.com
sales@inductotherm.com
President: Bernard Raffner
Director - Technical: Bert Armstrong
Director – Sales: Andrew Procopio

PRODUCTS and SERVICES - Inductotherm manufactures a complete line of induction heating and boosting systems for titanium slabs, billets, blooms, bars and rods prior to rolling. Other products include vacuum induction melting, holding, pouring, heating and coating equipment for thermal applications in air or controlled atmospheres for the metals industry. Coreless and channel furnaces with capabilities up to 500 tons; power supplies up to 42,000 kW; automated pouring systems with vision control; computer controls and charge handling systems.

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IML is a supplier of bar, sheet, tube, wire, rings and forgings in aluminum, titanium, nickel stainless steel, alloy and bronze products. In business for over 40 years, IML is approved by companies such as Rolls Royce, Boeing, Airbus, UTAS, GE, and Pratt and Whitney. Located near JFK Airport in NY, IML is able to offer same day shipping to countries worldwide with no minimum order charge for stock items.

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+1-610-325-0124
www.invera.com
peterd@invera.com

Invera is the leading supplier of ERP software for the metal distribution industry. Our STRATIX software provides advanced functions for sales, inventory control, production, shipping and outside processing of specialty metals.

Metal Specifications, Mill Test Certs and third party certificates can be controlled within STRATIX and as required emailed to customers upon shipment.

Full product traceablity enables companies to have complete control and accountability of all material purchased, processed and shipped to customers.

Invera also provides INVEX for eCommerce and Customer Web Service options over the internet. Coupled with the INVEX-CRM applications companies can optimize the sales process by recording quotes, activities and tasks. STRATIX-ONE a Decision Support & Management Dashboard provides executives and managers with real time sales, operations and financial information.

Because STRATIX was designed from the ground up for metal distributors and processors the inventory can be accessed using metal industry nomenclature. A complete solution tailor made for titanium metal companies.

Jiangsu Tiangong Technology Company Ltd.
0511-86319358
www.tggj.cn
rongjun_jiang@tiangong-tools.com

JIANGSU TIANGONG TECHNOLOGY CO., LTD was established in 2010, is a wholly owned subsidiary of Tiangong International. The company is located in JuRong City, JiangSu Province. our company is a production, sales strategy based on titanium and titanium alloy new materials, Tiangong has smelting, forging, hot rolling, cold rolling, finishing a series of production process of finished materials, the main products are titanium ingot, titanium bar, titanium tube, titanium plate, titanium coil, hot rolled tape. Titanium wire etc.

Producers, Distributors, Fabricators, OEM's, & Vendors to the Industry

Jinhua Top-Link
WWW.TOP-LINK.CC

Established in 2009.Jinhua Top-link Imp. & Exp. Co., Ltd is a professional exporter and supplier of rare metal materials, such as Titanium Molybdenum, Nickel, Etc. Our key products are Titanium Plate. Titanium Bar. Titanium Tube, Titanium Flange, Titanium Fasteners Clad materials etc. We are located in Jinhua, Zhejiang province, China with convenient transportation access. All of our products comply with international quality standards and are widely used in aerospace medical and other fields.

The products are greatly appreciated in a variety of different markets throughout the world. Our company cherishes every customer, and spares no effort to provide our customers with first-class products and technical services.

KASTO, Inc.
1-724-325-5600
www.kasto.com
sales@us.kasto.com

KASTO, Inc is the world's only COMPLETE supplier of Metal Cutting Machinery offering all available Metal Sawing methods. These include Band Saws, Plate & Block Saws, Cold Circular Saws & Hacksaws. Customers benefit from un-biased recommendations about which Metal-Cutting Equipment is best for their application. We also offer complete Storage and Retrieval Systems!

Kennametal
888-777-6852
www.kennametal.com
k-hntv.inside-sales@kennametal.com

Kennametal® is a leading global manufacturer of industrial tooling, premium-quality metals, master alloys and metal powders. Founded in 1938, Kennametal employs more than 11,000 people around the globe serving customers in more than 60 countries.

With a variety of capabilities and expertise to match, Kennametal consistently delivers cost-effective solutions that meet or exceed the titanium industry's strict purity, chemical, and particle-size specifications. Their experience in Vanadium (VAl), Molybdenum (Ti-17, AlMoTi, AlMoV), Niobium (AlNb) and Chromium(AlCr) master alloy production is consistently proven in on-time deliveries and exceptional product quality.

Kennametal's aerospace grade master alloys are manufactured via open air, inert gas, aluminothermic and/or VIM, where absolute control over impurities, inclusions, oxygen and minor additions are maintained. Prior to their release, Kennametal ensures that all alloys meet specification through stringent quality and test systems, which are certified to AS9100/IS9001, NADCAP and ISO17025.

All of Kennametal's customers are met with personalized and professional service on every inquiry. Materials and manufacturing experts are always available to consult on material applications and specific solutions.

Keywell Metals, LLC
+1-773-572-6173
www.Keywell.com

Keywell Metals, LLC is the industry leader in specialty steel recycling and a worldwide purchaser, processor and seller of titanium scrap metal for ingot formulation, alloy additions and ferro-titanium production. In addition to the complete range of processing capabilities, Keywell Metals, LLC operates the largest and most modern fully equipped on site analytical laboratory in the scrap metal industry. Every product shipped from Keywell Metals, LLC is fully certified and guaranteed to meet Customer Specification.

Kings Mountain International (KMI)
+1-704-739-4227
www.kmiinc.net
sales@kmiinc.net

Kings Mountain International (KMI) is an ISO9001:2015 / AS9100D certified precision grinding company.

KMI processing includes:
- Flat / Tapered / Contoured precision thickness machining
- Tolerances to +/-.001" (.0005" upon request)
- Sizes up to 110" x 360: larger sizes upon request
- Weight control for Aerospace applications
- Thin sheet grinding to .010"
- Surface Finishes from 250 RMS to 12 RMS and finer
- Polishing of sheet and plate to #3,#4 or #8 mirror. Non-directional also available

Benefits:
- State of the art measurement instrumentations
- Experience with all types of metals
- Plate / Sheets arrive clean, damage free and ready for fabrication
- Industries we serve:
- Aerospace / Defense/ Energy / Commercial Aircraft / Architecture

Kocks Pittsburgh Company
+1 (412) 3 67 – 41 74
www.kocks.de/en/company/locations/pittsburgh/
kpc@kocks.de

For KOCKS, innovation is a part of tradition. Innovation was at the beginning of the company's history with the idea of applying the 3-roll technology to forming tube as well as wire rod and bar. To date it determines the development of the company. To follow new avenues and to continuously optimize what seems to be perfect – this tradition keeps the company young and thrills our customers.

Producers, Distributors, Fabricators, OEM's, & Vendors to the Industry

Kolene Corporation

313-273-9220
www.kolene.com

Kolene specializes in designing and developing metal cleaning processes utilizing fused or molten inorganic salts. One of our major applications is surface conditioning of titanium oxides and forming lubricant removal. Surface conditioning prior to pickling and chemical milling promotes uniform surfaces and metal removal. Processes to remove vitreous lubricants and molybdenum disulfide are available.

Kolene designs both process equipment and process chemicals to provide single-source cleaning systems.

Kolene Corporation was founded in 1939 in Detroit by John Shoemaker. It continues today as a privately held company with 3rd and 4th generation Shoemakers active in the business.

Laboratory Testing Inc.

800-219-9095
www.labtesting.com
sales@labtesting.com

Laboratory Testing Inc. is a leading NADCAP and A2LA ISO/IEC 17025 accredited, independent material testing laboratory. The Lab specializes in metals testing and offers complete lines of destructive and nondestructive testing services, including chemistry, high- and low-cycle fatigue, fracture toughness, fatigue crack growth, tensile testing, ultrasonic testing and much more. We test input materials, prototypes and finished products.

Our Machine Shop can prepare all specimens and samples for testing, and runs on two work shifts for reliable, fast turnaround. We also build out specimens to order for customers who do their own in-house testing.

LTI has been in business since 1984 and has a team of over 170 employees that includes engineers, chemists and other technical experts. This group has years of experience in the aerospace, power generation, medical, transportation and other industries.

LTI is compliant with ASME NQA-1, ISO 9001 and ISO 13485 and is on the approved supplier list of hundreds of prime contractors, industry agencies and customers. Testing is performed to ASTM standards and industry specifications.

With a 104,000 sq. ft. facility near Philadelphia, PA, LTI is one of the largest full-service testing laboratories in the USA and fully capable of handling and testing materials of all shapes, sizes and quantities. Our divisions offer calibration services, fracture mechanics software systems and high-speed immersion ultrasonic testing systems. Call us or visit www.labtesting.com for a fast quote.

LAI International

+1-518-273-3912
www.laico.com/industrial

LAI International (formerly Zak Incorporated) is a fully integrated design, fabrication, machine, and test facility. We engineer, manufacture, and refurbish crucibles, liners, molds, and accessories for the remelting and production of specialty metals. Our manufacturing and consulting experience has contributed significantly to the VAR, ESR, Plasma, EB, C.C., and EBPVD processing industries. This experience, along with our precision CNC machining capabilities, will extend your product life cycles and improve the reliability of your process. Our ISO 9001-2008 certified services include a full range of dual pallet, multi-axis CNC machining centers with live tooling; MIG, TIG, and stick welding of copper and other dissimilar metals; hydro, helium, X-ray and other available NDT services. For more information about Zak Incorporated, please visit us at www.laico.com/industrial

L.C.M.A.

+ 352 26 55 43-1
www.lcma.lu
Mr. Otis Claeys – CEO: claeys@lcma.lu

LCMA is since very long an established partner on the international market for aeronautical, medical, industrial and petro-chemical applications.

We have acquired the know-how, skills and competences and are well informed about the needs, different standards and specifications.

The close cooperation with other entities of our Group makes us cover almost the entire product portfolio for all sectors.

LCMA has the ability to fulfil almost all needs of its International customers and is continuously adapting to market changes.

Our wish is for YOU to be able to benefit from our experience. We look forward to serve with our products and knowledge.

LL-resources GmbH

+43-316-890-368
www.ll-resources.com
Marc.gutschy@ll-resources.com

LL-resources is an independent, global mineral resource commodity management, trading and consulting establishment. We are running our own productions for Ferro Titanium, both in Sweden as well as in Russia. We offer our partners the total value chain solution (ore body to market) by maximizing value and minimizing risks. By firmly applying to our corporate governance, high quality standards and procedures & responsibility scheme we are in the position to guarantee professionalism, innovativeness and top quality to our diverse pool of small and midsized corporations as well as global players.

Producers, Distributors, Fabricators, OEM's, & Vendors to the Industry

Lomon Billions
+ 86 391 3126903
www.lomonbillions.global

Our company has been manufacturing titanium dioxide for 30 years and we recognize that it is important to continuously improve our knowledge, processes and manufacturing expertise – delivering technical excellence is our objective.

We understand that it is critical to fully support our customers technically. We also believe that it is important to improve current products and develop new ones so that we can be sure that we are meeting our customers' needs – now and in the future.

That is why we have invested for the future by building a 12,000 m2 purpose built technology center, which was opened in 2014. We have installed state-of-the-art analytical and application testing equipment and our team of technical experts are there to support, and work hand-in-hand with, our customers.

Lomon Billions manufactures and operates to international standards and it fully conforms to, and is certified with, ISO 9001:2008.

LOTERIOS S.p.A.

+39-02-9648281
www.loterios.com

LOTERIOS is a leading fabricator of titanium pipe, fittings, shell and tube heat exchangers and vessels as required.

Louyang Hexin Titanium Industry Co., Ltd

Luoyang Hexin Titanium Industry Co., Ltd was founded in 2014. Our company produces titanium products since 2014, including rods, tubes, and plates.

Products are widely used in petrochemical, sait. Offshore industry, energy generation and other industries. Typical applications include: Titanium and titanium alloy bar for hot-rolling; Titanium alloy standard parts; All kinds of corrosive fluid transmission pipeline system; Titanium bicycle tube; automobile exhaust pipe; Offshore aquaculture

Mair Research S.p.a.
+39 0445 634 444
www.mair-research.com
salesdept@mair-research.com

Since 1977, MAIR Research has offered specialized equipment and services to the steel industry, specifically helping tube and bar producers to create profitable and efficient production processes in a safe environment.

The highest levels regarding innovation and quality are achieved through young and well experienced technical personnel, for the electrical design, software programming and the pre and after sale service.

Single stand-alone equipment or customized complete and integrated finishing lines are developed by an experienced team of technicians and are entirely manufactured in two modern production facilities covering a total surface area of 36000 sqm.

Mair Research has gained significant experience in the field of finishing lines for tubes and bars by supplying turnkey solutions to customers in over 45 nations. Recently, fully integrated, automatic lines have been produced by Mair Research for the most demanding customers worldwide.

Thanks to the reliability of our equipment we reach important targets on the field of special alloys and titanium alloys. The modern controls and a dedicated softwares developed for the finishing field allows fully automatic processing on the lines and consequent reduction of production cast with high repeatability standards.

Mair Research can be your one-step supplier for all your finishing lines.

For additional info do not hesitate to contact us via our website: www.mair-research.com

Makino
1-800-552-3288
www.makino.com

A world leader in advanced CNC machining centers, Makino is committed to providing high-performance, leading-edge machining technologies and innovative engineered process solutions that enable manufacturers to focus on making what matters. Makino offers a wide range of high-precision metal-cutting and EDM machinery, including horizontal machining centers, vertical machining centers, 5-axis machining centers, graphite machining centers, and wire and sinker EDMs.

Makino's flexible automation solutions provide reduced labor costs and increased throughput in a variety of production volumes and designs. Makino's engineering services offers industry-leading expertise for even the most challenging applications across all industries. For more information, call 1-800-552-3288 or visit makino.com.

Medart, Inc.
+1-724-752-2900
www.medartglobal.com
sales@medartglobal.com

Medart designs and manufactures centerless bar peelers, coil to coil peelers, coil to bar peelers, straighteners, fastener wire pay-off systems, take up systems, plane straighteners and engineered material handling equipment. Purpose built processing equipment for the titanium industry.

Metals & Alloys UK Ltd
+44-(0) 114 354 0117
www.metalsandalloys.co.uk
Aaron James: aj@ferroti.com

We are a trusted manufacturer of Ferro titanium and supplier of Titanium scrap and Noble alloys. Specializing in Titanium, we buy and sell all grades of Titanium scrap. All incoming scrap is sorted and prepared at our UK facilities. Depending on the quality of the Scrap, it will either be used in our Ferro titanium production or recycled back to the metal industry.

METALVALUE
+33680562848
metal@honnart.fr

METALVALUE provides strategic consulting services and invests into selected industrial companies.

Producers, Distributors, Fabricators, OEM's, & Vendors to the Industry

Metalysis Ltd.
+44 (0) 1709 872 111
www.metalysis.com
kartik.rao@metalysis.com

Metalysis is a UK-based technology company, which has developed a proprietary process to produce metal powders at low cost using electrolysis. It is currently focused on the production of tantalum and titanium alloy powders for use in conventional and additive manufacturing, with a variety of applications in industries including aerospace, electronics, bio-medical, petro-chemical and automotive.

MetCon, LLC
+1-724-888-2172
www.MetConLLC.net

MetCon provides conditioning and finishing services for both intermediate and finished products, including bloom, billet, bar, plate, sheet, and machined or fabricated components employing a patented "Green" electrochemical technology. Product yields and costs are dramatically improved when compared to conventional processing. The technology can also provide alpha case removal, precise gauge removal, and ultra-bright micropolishing. MetCon is based in Monaca, PA, 30 miles northwest of Pittsburgh.

Mega Metals, Inc.
+1-602-258-6677
www.megametalsunlimited.com

Mega Metals Inc., is a globally recognized high quality processor of Titanium Turnings and Solids. We are certified by major mills and casting houses for prepared aerospace grade material. Our philosophy is to unite the highest quality in customer service with the highest quality of our materials, in order to serve the expanding international demands of the metals recycling industry.

METRACO NV
+32 56 234400
www.metraco.be

Metraco is a ferro alloys and non-ferrous metal trading group of companies established in 1993 with offices in Belgium, Germany, Switzerland and the UK.

Specialised in ferro titanium, titanium sponge, manganese metal and noble alloys.

Supplying all grades of FeTi 70 % and sourcing titanium scrap and low grade sponge for our ferro titanium production.

Supplying steel grade sponge directly to steel mills and master alloy producers worldwide.

MetSuisse® Distribution AG
+41 44 586 02 74
www.metsuisse.com
info@metsuisse.com

MetSuisse® reflects the precision and high quality products the industry requires. Next to our experience we are the first metal distribution company specialized in the medical industry, and operate strictly according to ISO 13485 (Medical) and the GDP standards valid for pharmaceuticals (besides ISO 9001). The stringent and precise requirements found in the medical & watch industry has given us the experience and abilities required to meet the various requests. Currently, we are specialized mainly in the metals titanium zirconium, CoCrMo, medical stainless and tungsten alloys. However, you can contact us with any of your sourcing requests. We work with dedicated partners worldwide.

MetSuisse® has a unique grinding facility allowing: precision grinding of titanium foils, sheets and plates technology applied for the Swiss medical and watch industry no min. quantities for CP Grade 1, 2, 4 and Ti6Al4V Eli min. 0.09 +/- 0.015 mm (= in inch 0.003543307" +/- 0.000590551").

We can ground up to a format of 1'000 x 2'000 mm.

Mid-West Machine
+1-205-663-0732
www.vulcangroup.com
sales@vulcangroup.com

Mid-West Machine™ provides metal conditioning equipment and systems for the Steel and Titanium industries. This includes both bonded wheel and coated abrasive belt grinders. We offer Traveling, Stationary, Gantry, Overhead, and Ingot End Grinders as well as material handling equipment for processing slabs, billets and rounds through the grinders.

Mobile Alloys
323-570-8914
http://mobilealloys.com

Titanium and titanium alloy scrap processing.

Prepared vacuum grade additive.

Monico Alloys
(310) 928-0168
www.monicoalloys.com
info@monicoalloys.com

Monico Alloys specializes in the processing of titanium scrap in the form of solids and turnings. Monico is a Global Mill processor for Titanium Scrap metal ISO 9001:2008 and approved by every major titanium melter. Monico Alloys prepares bulk-weldable solids, feedstock, cobbles, and turnings to rotor quality specifications. Monico Alloys remains the industry leader by utilizing only the latest scrap processing technology. Monico Alloys offers a wide variety of Titanium Alloy inventory which includes CP, 6-4, 6-2-4-2, 6-6-2, 3-2.5, and others.

Producers, Distributors, Fabricators, OEM's, & Vendors to the Industry

MoTiV Metals, LLC
+1-412-897-3066
www.motivmetals.com

MoTiV Metals, LLC is an independent sales and marketing company supplying molybdenum, titanium, vanadium and other products to the global steel, titanium and chemical industries. The company has a vast array of expertise and knowledge in domestic and international sales, logistics and supply chain management.

MoTiV Metals LLC offers Master Alloys to the Titanium industry, through its relationship with BHN Special Materials Ltd, including V-Al, Mo-Al, and other alloys.

Multi-Etch LLC
(928) 634-5307
www.multietch.com
info@multietch.com

Multi-Etch is a low-acid (pH 6.8), far safer etchant for titanium and other metals, with a less toxic waste stream, when compared with hydrofluoric and nitric acids. Preparing titanium with Multi-Etch enables anodizers to produce brilliant colors and welders to achieve welds that can withstand the rigors of deep space and deep ocean uses. Multi-Etch is also used to brighten titanium mill products and tumbled titanium parts, and to erase anodizing mistakes. Industries regularly using Multi-Etch include aerospace, medical, dental, bicycles, knives, jewelry and other arts, marine, architectural, and industrial.

NEOTISS
+33 1 70 98 30 05
www.neotiss.com
contact.fra@neotiss.com

NEOTISS is leader in the manufacturing of titanium and stainless steel thin welded tubes serving all demanding industry markets from power generation to desalination, process, automotive and more. Our products include not only bare, straight tubes but enhanced surface tubes, such as low fin, helix and corrugated tubes as well as u-bent tubes for special applications. The highest level of quality and safety in the market is guaranteed by stringent control procedures and unchallenged technical experience. The best testimony of product quality is the long list of references, worldwide. Our R&D teams develop ambitious innovation and research programs to enhance the performance of the tubes in the toughest environments. We have high manufacturing capacities, with production mills on three continents, Asia, North America and Europe, (namely in China, France, India, South-Korea, the USA) as well as a secured access to superior quality titanium strip.

NF&M International
www.nfm-titanium.com

NF&M International, Inc., subsidiary of VSMPO-Tirus US, is a producer of premium quality triple melted and standard grade titanium bar and billet products for the aerospace market and manufacturer of small-diameter precision tolerance bar and seam free coil products for aerospace fastener, automotive and medical applications. NF&M also provides a wide range of conversion services, including intermediate grinding and finishing of bar/billet, heat treating, straightening, bar peeling, bar polishing, pickling and inspection. NF&M's Nadcap approved laboratory performs room temperature tensile, hardness, hydrogen analysis and micro/macrostructure evaluation.

Ningbo Chuangrun New Materials Co., Ltd
+86-574-62067588
www.crnmc.com
mohan.su@crnmc.com

Ningbo Chuangrun New Materials Company (CRNMC) is a start-up company which was established in 2012, mainly focus in manufacturing of high purity titanium. Located in Ningbo, Zhejiang Province, CRNMC possess electrolysis refining process and double-gun EB melting process in house. CRNMC also has two branches in Zunyi and Baoji, for titanium sponge manufacturing and high purity titanium processing, respectively.

CRNMC provides world-class high purity titanium products in various of purities (from 99.95% to 99.999%), serves semiconductor industry, vacuum coating industry as well as aerospace industry. Not limited to high purity ingots, CRNMC supplies high purity titanium mill products such as sheets, blanks, billets, tubes and also high purity titanium powder.

CRNMC produces in well-established quality control system with ISO 9001 certificate and conducts business with professional knowledge and absolute integrity.

Nooter Construction Company
314.421.7211
www.nooterconstruction.com
kekitchen@nooter.com

Nooter Construction Company is a national full-service industrial construction contractor. Nooter Construction Company has a long history of providing innovative solutions to complex problems with field service of reactive alloys. We have the capability to perform large capital projects and smaller maintenance work that requires specialty welding with materials such as titanium. Please give Nooter Construction Company a call to discuss your projects where reactive alloys will be processed and welded in the field.

Norsk Titanium
U.S. Customers: +1 518 324 4010
European Customers: +47 97 42 22 00
www.norsktitanium.com
U.S. Inquiries: info@norsktitanium.com
European Inquiries: post@norsktitanium.no

Norsk Titanium AS is the world's pioneering supplier of aerospace-grade, additive manufactured, structural titanium components. The company is distinguished in the aviation industry by its patented Rapid Plasma Deposition™ (RPD™) process that transforms titanium wire into complex components suitable for structural and safety-critical applications. Norsk Titanium is a tier-1 supplier to Boeing and is committed to cost-reducing aerostructures and jet engines for the world's premier aerospace manufacturers. RPD™ is the world's first FAA-approved, 3D-printed, structural titanium, delivering substantial lead-time and cost savings for aerospace, defense, oil and gas, and commercial customers.

European Customers: +47 97 42 22 00

Producers, Distributors, Fabricators, OEM's, & Vendors to the Industry

North American Alloys
+1-800-985-2250
www.northamericanalloys.com

Now celebrating our 36th year in business, North American Alloys processes titanium alloy scrap for recycling and warehouses stocks of new and surplus lots of titanium mill products. North American Alloys warehouse in Kennewick, WA handles titanium sheet, plate, bar, billet and tubing.

Please visit our website at www.northamericanalloys.com to view our current inventory of titanium products. North American Alloys is always seeking new sources of excess inventory materials in titanium, cobalt or nickel alloys and specialty metals such as tantalum, columbium, zirconium and beryllium.

Contacts:
Michael Shulimson, President
Steve Meredith, Director of Sales
Peter Mason, Director of Purchasing
Peter Rockefeller, Warehouse Manager

NSL Analytical Services, Inc.
+1-216-438-5200
www.nslanalytical.com
mgorris@nslanalytical.com

A recognized leader in analytical testing, NSL Analytical Services, Inc. is an Independent Commercial Testing Laboratory specializing in Inorganic Elemental Chemical Analysis, Metallurgical and Microscopy Evaluations, Polymer Materials Testing and Metal Powder Evaluations. NSL Analytical helps customers achieve the highest standards of product quality from design to launch by providing accurate, reliable and repeatable materials testing results through Trust, Technology and Turnaround.

Nu-Tech Precision Metals
+1-613-623-6544
www.nutechpm.com
shook@nutechpm.com

Nu-Tech Precision Metals manufactures by hot extrusion seamless pipe, tube, fittings, bar, rod and shapes for nuclear, aerospace, military, medical, offshore, mining, chemical, sub-sea and corrosive environments. Extruded shapes, especially those for the aerospace industry in 6Al-4V, fit within a 12" (300 mm) circle size. Our extrusion process creates a near-net shape that reduces material and machining costs overall. Our ability to alpha-beta process results in improved fatigue resistance over beta extrusions… contact us to learn more about how this process will benefit your extrusion requirements. Seamless pipe from 1.5" (40 mm) to 14" (350 mm) plus specialty sizes and wall thickness. In-house finishing options including OD grinding or machining, ID honing or boring, hot straightening, pickling, non-destructive testing and electron beam additive manufacturing and welding are a few of the services we offer.

Oerlikon Metco (US) Inc.
https://www.oerlikon.com

Oerlikon Metco is a global leader in surface engineering solutions that bring benefits to customers through a uniquely broad range of surface technologies, equipment, materials, services, specialized machining services and components. The surface technologies such as Thermal Spray and Laser Cladding improve the performance and increase efficiency and reliability. Oerlikon Metco provides a comprehensive manufacturing, distribution and service network, catering to aviation, medical, power generation, automotive and other strategic growth industries such as additive manufacturing and operates a dynamically growing network of more than 50 sites in EMEA, Americas and Asia Pacific.

OSAKA Titanium Technologies Co., Ltd.
+81 3 5776 3103
www.osaka-ti.co.jp

OSAKA Titanium technologies Co., Ltd. manufactures premium quality titanium sponge mainly for aerospace use, high-purity titanium billet for semiconductor industry, titanium powder for powder metallurgy and additive manufacturing, and other titanium-silicon related products.

Paris Saint-Denis Aero
http://www.psdaero.com

PSD AERO is one of the main supplier for raw materials products of key players in the aviation sector (for example AIRBUS, SAFRAN, AIRBUS HELICOPTERS, DASSAULT AVIATION, etc). Our Quality Management System meets the IAQG's series requirements.

Our stock at your disposal is the biggest Aerospace metallic stock in the world.

With our experience and rigor acquired during the last few decades, the company consists of 90 staff members that have enabled us to increase our turnover 10 times in 10 years.

We are providing solutions in cutting optimization (conventional saws but also waterjet).

Description of our waterjet capabilities:
- Size up to 12 000 x 3 000 mm
- Waterjet Pressure up to 6000 bars
- Mono et Multi cutting heads
- Part up to 10 tons

Producers, Distributors, Fabricators, OEM's, & Vendors to the Industry

PCC Metals Group

http://www.pccmetalsgroup.com

The PCC Metals Group brings together TIMET, a vertically integrated titanium supplier; and Special Metals, a leader in nickel alloy development. With over 200 years of collective experience, each organization is an R&D leader in their respective industries. The PCC Metals Group unites the unique capabilities of each company, leverages their strong metallurgical expertise, and is able to better serve customers in the specialty metals market.

Rob – we need to add the logo for PCC Revert Group, it is in the logo files sent, but I can't open and include the file here because I don't have the software to open the .eps file provided.

PCC Revert Group

http://www.pccforgedproducts.com/brands/caledonian_alloys/

The PCC Revert Group combines the assets of Caledonian Alloys and SOS Metals, and is the world leader in the management of nickel and cobalt base superalloy and titanium alloy recycling for the aerospace, land-based turbine, and chemical industries. The company transforms revert into material ready for remelitng to produce new nickel, cobalt, or titanium alloys. The Revert Group provides customers with a range of tailored revert management services designed to enable them to optimize the use and value of their own revert material. Accredited with all major vacuum and high temperature melters worldwide, Caledonian Alloys and SOS Metals supply fully processed nickel and titanium revert material to the melting industry. Both SOS Metals and Caledonian Alloys also purchase revert material from a wide range of industrial customers throughout the world.

Perryman Company

+1- 724-746-9390
www.perrymanco.com

Perryman Company is a vertically integrated producer of specialty titanium products. Our operations include melting, forging, and fabrication to finished products. Perryman's quality, technical expertise, and customer service is unmatched. Perryman supplies and services customers in the aerospace, medical, consumer, recreation, infrastructure and 3D printing/additive manufacturing markets worldwide. Approvals include ISO 9001:2015; AS9100D and NADCAP. Perryman Company is headquartered in Houston, Pennsylvania. Our melting facility is located in Coal Center, PA and our hot rolling and finishing operations are in Houston, PA. Additional intermediate processing is located in Frackville, PA. Company sales offices are located in Houston, PA; Philadelphia, Los Angeles, London, Zurich, Tokyo, and Xi'an.

Plymouth Engineered Shapes

800-718-7590
www.plymouth.com
jlake@plymouth.com

Plymouth Engineered Shapes is the premiere provider of near-net extruded shapes for a large variety of applications. All customers want to squeeze more cost out of their parts and Plymouth Engineered Shapes offers the solution in Titanium, Stainless steel, Alloy steel, or Nickel-based alloys. Our Engineers are capable and willing to work with your design engineers to develop the most optimum near-net shapes possible to make your finished parts. No other manufacturer in North America offers so much experience in special shape technology, or provides so many value-added options to meet your product specifications.

PM International Suppliers

(863) 644-6300
www.PMfirst.com
info@pmfirst.com

We supply pipe and fittings, tubing, valves, flanges, bars, sheet and forgings with numerous worldwide sources for limitless applications. PM International Suppliers specializes in providing products in exotic materials such as duplex, super duplex, 6% molybdenum stainless-steels, titanium, copper nickel and nickel alloys.

Industries we serve:

- Offshore Petrochemical
- Geothermal
- Chemical Manufacturing
- Aerospace
- Desalination
- Power Plants
- Water Treatment Facilities and more!

PMIS customers are worldwide, and we handle everything from one-off emergency deliveries to complex, long-ranging project installations.

Precision Abrasives

412-809-9822
Fax: 412-809-9826
www.precisionabrasives.net

We are the industry leader in abrasives and abrasive applications for the primary metals market. We offer the most reliable technical services and the widest selection of engineered products in the industry.

We are the Largest US Distributor for Conditioning Wheels, Roll Grinding Wheels and Large-Diameter Cut-Off Wheels. We are Norton's Only Primary Metals Market Specialty Distributor and VSM's Fastest Growing Distributor over the last four years. We are the Exclusive Distributor for Mid-West Machines for the Primary Metals Market.

Producers, Distributors, Fabricators, OEM's, & Vendors to the Industry

Precision Metal Grinding, LLC

+1-949-872-2976
www.pmgrinding.net
sales@pmgrinding.net

Precision Metal Grinding is a grinding service company that supports the aerospace and medical industry. Providing the highest quality of surface finishes for critical applications (Ra and Rz). Capable of machining thin sheet (minimum: 0.008") and thick plate (maximum: 6.00") up to 78.00" wide x 230.00" long. Precision Metal Grinding offers a standard thickness tolerance of +/- 0.001" and can provide +/- 0.0005" upon request. Our standard practices ensure consistency over large orders and from batch-to-batch. With years of experience under our belt, we are capable of machining Titanium, Stainless Steel, Aluminum, Nickel-base Alloys, Magnesium, Cobalt-base Alloys, Zirconium and others.

Contact us with your unique requirements today.

Precision Thin Metals

http://www.arnoldmagnetics.com/Precision-Thin-Metals

The Precision Thin Metals (PTM) business of Arnold Magnetic Technologies produces thin and ultra-thin alloys that improve the power density of motors, transformers, batteries and many other applications in Aerospace, Industrial, Motorsport, and Medical markets. Customers rely on us for thin-rolled titanium in applications that demand high performance and consistent quality. Arnold's Precision Thin Metals business offers titanium products in a number of commercially pure grades and several standard alloy compositions. Our titanium and titanium alloys are available in cold rolled or annealed condition. PTM is Nadcap certified for heat treatment.

President Company Ltd.

+886-227411-190
www.presico.com.tw
presico@presico.com.tw

President Co., Ltd., established in Taiwan in 1969, is one of the largest titanium stockists in the Asia. Our business focus on the trading of high quality titanium with diverse stocks. Besides, our product includes titanium slabs, sheets, bars, wires, pipes, fasteners, castings, etc. We commit to supply the most satisfying high quality titanium materials for users with quick lead time and favorable after sales service. Currently, our sales network is well deployed all over China, Taiwan and South-East Asia countries.

President Titanium Co., Inc.

+1-800-225-0304
www.presidenttitanium.com
sales@presidenttitanium.com

President Titanium has the largest inventory of domestic 6Al/4V, 6Al/4V ELI, and Grade 4 titanium bar, sheet & and plate in the country. We have been serving the aerospace, military and medical industries since 1973. Most orders shipped in 1-2 days, call for our free booklet.

Product Evaluation Systems, Inc.

724-834-8848
www.PES-Testing.com
Mic@PES-Testing.com

Product Evaluation Systems (PES) an independent testing laboratory, located in Latrobe, PA. PES is a proven partner in materials testing and offers exceptional turnaround specializing in mechanical, metallurgical, chemical and nondestructive testing and analysis. Since 1979, PES has been proud to offer exceptional personalized response to customer needs and our Rapid Response, Dependable Delivery continues to help our clients streamline the process of outsourcing their materials testing. PES is both NADCAP and ISO 17025 accredited and holds multiple customer accreditations such as GE Aviation, Pratt & Whitney (MCL), Rolls-Royce Aerospace (SABRe) and ATI Nuclear. Accreditation awarded to PES covers mechanical testing, test specimen preparation, metallography, chemical analysis and nondestructive evaluation. Industry sectors include, but are not limited to, Aerospace, Additive Manufacturing (AM), Power Generation, Oil & Gas, Mining and Recovery/Reclamation.

Quebec Metallurgy Center

+1-819-376-8707
www.cmqtr.qc.ca

The Quebec Metallurgy Center is a technology transfer center located in Trois-Rivieres, Quebec, Canada. Our activities focus on supporting the technological development of manufacturing companies in the metallurgical sector. CMQ has developed a broad expertise on the transformation and development of advanced alloys such as titanium, zirconium, aluminum and nickel. Our semi-industrial metalworking facility is equipped for short series production with controlled atmosphere casting, induction skull melting, plasma arc melting, permanent mold, shell mold and sand mold casting; advanced welding, thermal spraying, heat treating, hot isostatic pressing, additive manufacturing (directed energy deposition, binder jetting and ultrasonic welding) and non-destructive testing.

RathGibson

+1-608-754-2222
www.rathgibson.com
inquiry@pccenergy.com

RathGibson is one of the world's leading manufacturers of precision welded tubing and pipe in both stainless and specialty alloys. From straight lengths to coil, welded and drawn, or seamless tubing and pipe, our products can be made from any of our 40 high-performance alloys so that they will reliably perform no matter how demanding or corrosive the application. At RathGibson, a successful technical process to meet any customer requirements is a priority, so that only the finest and most high quality tubing is delivered. That is why RathGibson invests in unique capabilities to develop customizable products for industries including power generation, renewable, oil and gas, petrochemical, food and dairy, beverage, pharmaceutical, and general commercial.

Producers, Distributors, Fabricators, OEM's, & Vendors to the Industry

Reading Alloys | AMETEK Specialty Metal Products

+1-610-693-5822
www.readingalloys.com
Jennifer.Rieger@ametek.com

Reading Alloys, part of AMETEK Specialty Metal Products, is one of the world's premier manufacturers of high quality master alloys as well as titanium metal powders. Our products are approved for use in critical aerospace and medical applications that require the most stringent quality requirements and demand the highest purity.

MASTER ALLOYS
Reading Alloys produces a wide variety of master alloys comprised of vanadium, molybdenum, niobium, chrome, and aluminum among other elements. Critical applications include:

- Rotor grade titanium
- Aerospace and non-aerospace grade titanium
- Vapor phase aluminizing (VPA)
- Commercial metals
- Super alloy metals applications

HIGH PURITY TITANIUM POWDERS
Reading Alloys manufactures high purity hydride-dehydride (HDH) titanium powders:

- Thermal Spray/Medical Powders - Ti sponge, Cp Ti, and Ti 6Al/4V
- Ti powders for Powder Metallurgy (P/M) applications
- Ti powders for sputtering targets
- Advanced Coating Alloys Al/Cr, Al/Co, CODEP

In addition, a series of gas-atomized specialty powders for hard-facing, brazing, and thermal sprays further compliment the product offerings.

ADVANCED MANUFACTURING PROCESSES
Reading Alloys is known for its superior expertise in the following processes:

- Aluminothermic smelting
- Induction melting
- Vacuum sintering
- Toll melting
- Cold isostatic press (CIP)
- Hydride/dehydride (HDH)

Our quality system is certified to ISO 9001:2008 and AS9100C and we have a fully accredited lab that is NADCAP certified.

For the widest product portfolio, unsurpassed reliability, and unmatched technical expertise, trust Reading Alloys.

Reading Alloys, Fine Tubes, Superior Tube, Hamilton Precision Metals, AMETEK SMP Wallingford and AMETEK SMP Eighty Four– all leading manufacturers of advanced metallurgical products – form AMETEK Specialty Metal Products.

ReMelt Scientific, Inc.

+1-330-440-0402
www.remeltinc.com
sales@remelt.net

ReMelt Scientific is a global supplier of Titanium Chip Melt Preparation Systems and Weigh and Blend systems. We specialize in titanium and high temperature alloy chip crushing, centrifuging, aqueous wash and solvent cleaning, thermal drying, fines screening, and magnetic and gravimetric separation to prepare chips to for melting. We also specialize in Weigh and Blend systems that weigh and blend titanium chips, sponge, master alloys, aluminum, iron, and TiO^2 to achieve customer specified chemistry requirements.

Renton Coil Spring Company

+1-425-255-1453
www.rentoncoilspring.com
info@rentoncoilspring.com

Renton Coil Spring Co. (RCS) is a world-class spring manufacturer for aerospace and performance markets and has been providing superior quality parts and performance since 1949. Design and material capabilities, along with complete performance solutions has lead RCS to become a top supplier of quality springs, wire forms, assemblies, and flat metal parts with thousands of applications across the world.

Retech Systems LLC

+1 (707) 462-6522
www.retechsystemsllc.com
sales@retechsystemsllc.com

Retech is the world's leading supplier of Electron Beam (EB) and Plasma (PAM) Cold Hearth furnaces for melting and refining titanium and titanium alloys. Retech advanced vacuum metallurgical systems also include Vacuum Arc Remelt (VAR), VAR Consumable (Skull) Casting, EB and PAM Consolidation furnaces, Plasma Welders, Vacuum Induction melting (VIM), Precision Investment Casting (DS/SC/EQ), Cold Wall Induction melting and casting, Vacuum Heat Treating, and Gas Atomization for metal powder production. All our furnaces are available in various sizes and configurations, from simple laboratory-scale to large, custom engineered systems. Further, we provide customer access to a wide range of in-house resources, including technology, material and process development. Identifying customer needs, as well as understanding the importance of producing relevant, viable, and cost-effective technologies, is the foundation upon which Retech is built.

Retsch

Retsch Business Unit Manager:
Kyle James
(267) 757-0351 ext. 104
info-us@verder-scientific.com

Retsch, part of Verder Scientific, is the world leader in solid material sample preparation equipment for quality control and research and development laboratories. Our expertise and devotion to providing the highest quality products for accurate and reproducible sampling methods is unsurpassed. Our selection of mills, sieve shakers, and sample dividers offer the industry standards for sample preparation.

Producers, Distributors, Fabricators, OEM's, & Vendors to the Industry

Rex Heat Treat

+1-215-855-1131
www.rexht.com
chris.constable@rexht.com

Rex Heat Treat is a family owned and operated business that was founded in 1938. We take pride in our ability to partner with our customers to gain insight regarding their future needs. We are a leader in customer service and quality for the heat treating industry. Our unique furnace design allows us to water quench titanium raw material and formed parts up to 16' long to meet aerospace and medical specifications. We have furnaces capable of annealing up to 30,000 lbs. in one batch and we are approved by almost all major Aerospace companies. We have 3 locations in Eastern United States, Anniston Al., Bedford PA., and Lansdale, PA. Rex Heat Treat has experienced metallurgists on site and we offer testing services. We look forward to exceeding your expectations with timely communication and time performance.

Rolled Alloys

+1-800-521-0332
www.rolledalloys.com
onlinesales@rolledalloys.com

Rolled Alloys is a global leader supplying titanium & specialty alloys. For over 65 years, our comprehensive inventory has served the aerospace, defense, medical, oil & gas, and power generation industries. We hold many quality approvals and certifications that make us a preferred supplier to companies that are respected around the world.

Rolled Alloys offers extensive processing capabilities, best-in-class e-commerce, supply chain management support, and metallurgical expertise. We maintain 13 inventory locations across North America and Asia, with additional representatives in Europe.

Roskill Information Services Ltd.

+44 (0)208 417 0087
www.roskill.com
info@roskill.com

Roskill global market reports include the latest information on supply, demand, end-use applications, trade and prices for a wide range of metals and minerals including titanium, molybdenum and vanadium. Roskill reports also provide informed forecasts of future trends.

Roskill's expert researchers make a thorough and objective analysis of all available data, from sources across the globe. This includes a large and invaluable network of contacts including the key industry players in these markets, making Roskill's research unrivalled in terms of breadth, depth, accuracy and expertise.

To build on this wealth of data, Roskill also offers bespoke consultancy services that can help to explore and understand any specific scenarios or analysis requirements you may have.

S. Letvin & Son, Inc.

+1-310-327-0590
www.titaniumscrap.com

S. Letvin & Son, Inc., specialists in processing high temperature scrap metals, has been in business since 1947. We prepare a high quality 6/4 titanium feedstock package that meets AMS 4928 Chemistry Specifications. We have developed a unique and proprietary process to return mixed 6/4 titanium fasteners to specification 6/4 titanium. The final product is 6/4 titanium "Rotor Grade" feedstock, which is heavy, dense, clean and extremely consistent in chemistry and gases. Our 6/4 titanium feedstock package is approved and desired by most major US Titanium Mills, as well as many smaller investment casters worldwide.

S+D Spezialstahl Handelsgesellschaft mbH

+49 211 230999 11
www.s-d-group.com
o.frankenheim@s-d-group.com

S+D Spezialstahl GmbH, member of the BIBUS Holding AG, is one of Europe's largest stockists for semi-finished high-performance materials like titanium and titanium alloys, special stainless steel for aviation and aerospace or nickel and nickel alloys.

We supply into the following markets:

Aviation and Aerospace / Motor Sports / Defence Technology / Medical Technology

Offshore / Petrochemical / Chemical and Process Engineering / Plant and Equipment Manufacturing / Electroplating / Turbine Manufacturing / Marine Engineering / Energy Industry / Automotive Industry / Universities and Research Institutes

We deliver just in time any time. At S+D we are able to cut all our materials according to our customer's exact requirements utilising our "state of the art" bar saws and plate saws. We also offer precision water jet cutting. Our just in time service provides our customers with cost savings and security of supply. S+D is aerospace approved according to EN 9120 issued by DNV GL

Sandinox Comercio, Importação e Exportação LTDA

+ 55 15 3335 3565
www.sandinox.com.br

Established in 1986, Sandinox is the largest medical distributor for the Brazilian market, offering a full range of products in titanium, cobalt, and stainless steel alloys for the medical industry. Our goal is the constant search for technologically advanced products and materials that will ensure quality and the desired satisfaction of our customers.

Producers, Distributors, Fabricators, OEM's, & Vendors to the Industry

Sandvik Materials Technology Product Unit Special Metals
+46-26-260000
www.smt.sandvik.com

Product Unit Special Metals with two manufacturing locations (Sweden and USA) belongs to Sandvik Materials Technology and is a long term experienced manufacturer of seamless tubes and complementary products in Titanium, Titanium alloys and Zirconium based materials for a broad range of industrial applications as well as applications within nuclear, aerospace and medical industries.

The full scale commercial manufacture, which started in 1964 is fully integrated from VAR-remelting of Titanium resp. Zirconium sponge up to finished product.

Scanacon, Inc.
330-877-7600
www.scanacon.com

At Scanacon, our mission is to help stainless, titanium, zirconium and specialty alloy finishers achieve efficient, high quality production at the lowest cost.

With over 30 years' experience as the World's preferred supplier of acid management equipment, our knowledge, experience and equipment offers the producer the ability to achieve productive, efficient and cost effective finishing operation. Our solutions have consistently proven themselves across a wide range of pickling, etching and milling applications for all wrought and cast forms.

Scanacon understands that ease of use, low maintenance requirements and efficiency is key to designing process equipment that delivers value, day after day. No two producers or applications are exactly alike. Delivering value requires a knowledge that can only be gained by experience and is why Scanacon continues to be the chosen supplier for acid management system by all major producers, worldwide.

Schaffer Grinding Co., Inc.
+1-323-724-4476
www.schaffergrinding.com
info@schaffergrinding.com

SCHAFFER GRINDING CO. is a toll processor of aerospace alloy materials including: Titanium, high temperature alloys, nickel based alloys, and ferrous materials. Processes include: Precision sheet and plate grinding (90" X 240"), band saw cutting, planer milling, rotary and surface grinding. Schaffer Grinding offers its customers coast to coast service with production facilities in California and Ohio.

Sciaky Inc.
877-450-2518
www.sciaky.com
sales@sciaky.com

Sciaky, Inc., a subsidiary of Phillips Service Industries, is a world leader in metal 3D printing solutions. Our exclusive Electron Beam Additive Manufacturing (EBAM®) process is the fastest, most cost-effective 3D printing process in the market for large-scale metal parts, allowing manufacturers to save significant time and money over traditional manufacturing and rapid prototyping processes. Sciaky also provides industry-leading electron beam (EB) and advanced arc welding systems, as well as robust EB welding services, for the aerospace, defense, automotive, healthcare and other manufacturing industries. Our welding equipment meets rigid military specifications to manufacture items such as airframes, landing gear, jet engines, guided missiles and vehicle parts.

Sector3 Appraisals, Inc.
+1-718-268-4376
www.sector3appraisals.com

METALS & CHEMICALS INVENTORY VALUATIONS FOR ABL FINANCING

Sector3 Appraisals is an independent appraisal firm specializing in the metals and chemicals industries. We value inventory as well as machinery & equipment at all levels of the manufacturing chain, from major producers to distributors and OEMs through Tier-II suppliers. Clients use Sector3 valuations to secure financing for working capital, M&As, and debtor-in-possession settlement. Sector3 also provides liquidation consulting.

Sector3's focused expertise produces a targeted, insightful and truly useful appraisal.

We help companies and lenders decipher the underlying value of raw materials, metals, chemicals, plastics, and commodity inventory and machinery and equipment. We are successful because we:

- Specialize in the metals, chemicals, plastics, and commodity markets;
- Offer extensive metals, chemicals, and plastics valuation experience
- Believe customer service is a long-term objective.

These advantages set Sector3 apart from other appraisal companies, and have made Sector3 one of the largest metals, chemicals and commodity appraisal firms in the U.S.

Service Steel Aerospace
+1-800-426-9794
www.ssa-corp.com
sales@ssa-corp.com

Service Steel Aerospace is a customer oriented stocking distributor of high performance stainless steel, titanium, alloy steel, nickel based super alloy, and maraging steel. We are committed to providing quality products to the aerospace industry and other critical application industries throughout the world. SSA performs a wide array of value added processing services designed to meet the specific needs of our customers. Our commitment to the quality and service has made SSA the leader in the industry for over 40 years.

Producers, Distributors, Fabricators, OEM's, & Vendors to the Industry

SES, LLC
330-821-3322
www.seseng.com
ses@seseng.com

SES is a leading supplier of equipment and services for the metals industry. SES handles projects ranging from small specialty items to major capital expansions, as well as redesign/rebuild of existing equipment. Our strategic partnership with Daisho Seiki Corp, Japan, has broadened our ability to supply Bar Turning and Burnishing Technology to the North American Market. Capabilities include complete supply of Turning and Polishing Lines for bar manufacturers/processors. Custom cell layouts including cut-to-length, chamfering, NDT inspection, prove-up stations, hex bundling, can be added to suit requirement. Testing of equipment with customer supplied material can be performed at SES' manufacturing facilities.

Headquartered in Alliance, OH, our over 40-year history includes design and supply of transfer cars, transporters and all meltshop equipment, slab handling equipment, long product handling and processing equipment, strip processing equipment, coil handling equipment, custom designed and built equipment, automation & Level I/II system design, complete system integration, PLC, drives, & HMI integration, power and control system design, and facilities engineering.

Shaanxi Lasting Titanium Industry Co., Ltd.
00 86 29 89651035 89651082
www.lastingtitanium.com
info@lastingtitanium.com; titanium01@263.net

Shaanxi Lasting Titanium Industry Co., Ltd. is the leading Titanium manufacturer and exporter in China. With more than 20 years' experience, we own two mills in Baoji -The Chinese Titanium City. We are mainly engaged in melting, forging, rolling and machining manufacturing line in titanium and titanium alloy, with an investment of USD 50 million. Exported 3000 mt ingots, 2500 mt forgings and 5000 mt machined parts annually. Our main products include titanium ingots, slabs, bars/rods, plates/sheets, pipes/tubes, forgings, fittings, wire, powder, standard parts, non-standard equipment and other corrosion resistant metals such as zirconium, tantalum, tungsten, molybdenum, niobium.

Shasta Services LLC
www.shastainc.com

Shasta provides high-quality grinding, machining, cutting and robotic scarfing services, primarily to the titanium industry. In business since 1974, Shasta operates multiple MidWest-style grinders to condition the surface of various metals, primarily titanium, for most major US titanium producers.

Shasta and its affiliates also provide robotic scarfing, high-volume torch cutting and a variety of machining services such as bar peeling, center-less grinding, saw cutting, straightening, polishing, turning, testing and various other services.

Shasta is focused on providing high quality services with a quick turnaround time.

Sierra Alloys / TSI Titanium/ PRV Metals Companies
+1-626-969-6711
www.prvmetals.com

Manufacture and supply forged and rolled products in Titanium alloys, nickel-cobalt base alloys, precipitation hardened stainless and high alloy steels from small rectangular and round bar to large section size open die forged bar and stock.

Simonds Saw
www.simondssaw.com

Manufacturer of industrial saw blades. The oldest cutting tool manufacturer in North America, Simonds offers one of the broadest and most trusted names found anywhere in the world of cutting tools. Many industries have grown to depend on the quality and innovation of Simonds products and services. We have a continuing tradition of quality, design, and innovation. Simonds has innumerable patents, a global leader in high-performance and high-production sawing. The first bandsaw manufacturer in the world to be ISO certified and we remain certified so today. We set our goals high and our customers have grown to expect it.

Since 1832… The Professionals' Edge.

Solar Atmospheres
+1-855-934-3284
www.solaratm.com
info@solaratm.com

Solar Atmospheres provides vacuum thermal processing for titanium material, parts, forgings, and weldments. With the world's largest commercial vacuum furnaces up to 48 feet long, Solar is capable of vacuum processing furnace loads of bar, billet, sheet, and plate up to 150,000 pounds under 1x10-6 Torr vacuum levels. Specific heat treat services provided are: degassing, beta annealing, homogenizing, age hardening, creep forming, Superplastic Forming (SPF), hydriding/dehydriding, stress relieving and Fluorescent Penetrant Inspection. ISO9001:2015 / AS9100D Registered, Nadcap Accredited for heat treating and NDT (Non-destructive testing), MedAccred Accredited for heat treating, and Boeing approved in heat treating, NDT (Non-destructive testing) services and BASCA (Beta Anneal Slow Cool Age). Solar Atmospheres serves customers with plants located in Pennsylvania, South Carolina, and California.

Solar Manufacturing, Inc.
+1-267-384-5040
www.solarmfg.com
info@solarmfg.com

Since 2002, heat treaters from a wide variety of industries trust in our ingenuity for trail-blazing innovation and reliable performance from our vacuum heat treating furnaces.

Solar Manufacturing knows vacuum heat treating inside out. Our engineers bring decades of experience to the design side of the business and our knowledgeable technicians provide world-class manufacturing keeping Solar in the forefront of vacuum furnace innovations. We offer unmatched expertise to solve our customer's most difficult heat treating problems and advance vacuum furnace technology. Our ingenuity has led the industry

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with advanced hot zone insulations, high-performance gas quenching, and state-of-the-art SolarVac® Polaris automation, a new generation of PLC-based control systems developed to simplify the operation and expand the capabilities of our vacuum furnaces.

Like our engineered-to-order furnaces, our standard models are rich in features and versatility to suit our customer's specific and demanding requirements. Models range from compact R&D furnaces to large horizontal, front loading production furnaces. In addition to vertical bottom loading configurations, we also design unique, very large capacity car-bottom furnaces in lengths up to 48 feet.

Solar Manufacturing has also developed a good name throughout the industry in Aftermarket Sales and Support. Whether you need an energy efficient replacement hot zone, spare parts, responsive field service or a maintenance contract, we are able to assist you in keeping your vacuum furnace at its peak operating condition.

Special Rare Metals AS

www.srm-sa.ch
info@srm-sa.ch

SPECIAL RARE METALS is a company active since 2014, mainly in Europe and UK, specializes in the recovery and trading of titanium and super-alloys scrap (based on nickel, cobalt, molybdenum), in form of turning, solid, slag and flashing. Titanium is our main business, making us experts in our field. The materials we handle come from industries active in the bio-medical, aeronautical, petrochemical and energy sectors.

Most of these materials are regenerated and sold by us, such as bio-medical titanium and Ni-Co-Cr alloys. Our experience in detailed sorting and processing material, checking chemical composition, sizing and surface inspection, for which we collaborate with excellent partners specializes in preparation and regeneration of scrap, allow us to guarantee excellent product quality. Thanks to this synergy, we have long been suppliers of primary companies, specializing in vacuum melting.

Also, Special Rare Metals in 2016 has filed a patent for the safe transport of scrap and titanium turning, which are at very high risk of fire. Our patent is based on a box able to completely eliminate the oxygen inside it through a vacuum system; by eliminating the air inside, the risk of fire is eliminated, allowing transportation and loading and unloading operations in complete safety for 19 hours.

Specialty Metallurgical Products Co. Inc.

717-246-0385
www.smptitanium.com

Specialty Metallurgical Products (SMP) was started in 1984 by James H. Clark (Jim Clark Sr.), when he envisioned the need for a better, less costly grain refiner than the then standard master alloy. Originally the company was started to produce Master Alloy in Shot form, however that product never made it into the marketplace. Instead SMP was the first company to produce and offer a 100% titanium tablet to the aluminum alloy producers, free from binders and salts. Today, almost all aluminum smelters use 100% titanium tablets/pucks to make their titanium additions.

The Company's manufacturing Plant and Offices are located in Red Lion, Pennsylvania and have been since 1994. Although the Company has relocated several times in the last 20 years, it has never moved out of York County, Pa.

Specialty Metals Company

+32- 2645-7670
www.uktmp.kz
Sylvain.gehler@specialtymetals.be; Danielle.vanoverschelde@specialtymetals.be

Specialty Metals Co is the major shareholder of UKTMP (Ust Kamenogorsk Ti Mg plant) located in Kazakhstan. UKTMP produces Ti sponge, CP and alloy ingots and slabs.

Specialty Metals Processing, Inc.

+1-330-656-2767
www.specialtymetalspro.com
bwilson@specialtymetalspro.com

Specialty Metals Processing (SMP) is a leading processor of titanium plates, slabs, sheets and coil. Located in northeast Ohio, SMP has one of the largest abrasive belt grinding and polishing operations in the U.S. Our 170,000 sq. ft. facility houses multiple processing lines. We are your reliable source for precision grinding where we can accommodate widths up to 72", material thickness up to 10" and lengths up to 240". We are your reliable source for gantry grind services where we can accommodate widths up to 144", material thickness up to 24" and lengths up to 1200". In addition, we are your reliable source for pinch roll grinding, alpha case removal and reconditioning.

- Precision grinding up to 72" wide and 244" long
- Ability to polish/grind/recondition plate/slabs up to 12' wide by 100' long
- Providing #3, #4, # 6, brushed or matte finishes or custom matched abrasive belt finishes, one or two sides.
- Providing #7 and #8 buff finish on stainless coil
- Offering special inspections, packaging, line marking & PVC options
- ISO 9000 certified since 1996
- Offering one stop shopping on many orders
- Same day quoting on most inquiries
- One sheet or truck load quantities, no order is too big or too small

Please visit our website atwww.specialtymetalspro.com

Stack Metallurgical Group

503-285-7703
http://www.stackmet.com/

The Stack Metallurgical Group consists of heat treating facilities in Portland, Oregon and Spokane, Washington, as well as Aerospace Aluminum Processing in Salt Lake City, Utah. The combined capacity and versatility of these three facilities rivals nearly any other thermal processor in the western United States.

The Stack family prides itself on safety, quality, and outstanding customer service. We have long been a trusted supplier to numerous quality-critical industries including aerospace, energy, and medical implant. As evidence of our service-based culture, the Salt Lake City facility is the proud recipient of the Boeing Supplier Excellence Award 9 times.

Stack offers the most modern heat treating and metal processing equipment, a comprehensive list of aerospace and OEM approvals, and a highly-talented team of experts ready to exceed your highest expectations.

Producers, Distributors, Fabricators, OEM's, & Vendors to the Industry

Starrag USA Inc.

+1-859-534-5201
www.starrag.com
ussales@starrag.com

Engineering precisely what you value

Starrag Group is a global technology leader in manufacturing high-precision machine tools for milling, turning, boring and grinding workpieces of metallic, composite and ceramic materials.

Principle customers are internationally active companies in the Aerospace, Energy, Transportation and Industrial sectors. In addition to its portfolio of machine tools, Starrag Group provides integrated technology and maintenance services that significantly enhance customer productivity.

Aero Structures Five and six axes high torque machining centers, 50 cubic inches per minute of Ti metal removal with the highest degree of accuracy. That's STARRAG.

Aero Engines
Blades, Blisk, IBRs, Impellors and Casings – Processing requirements drive our machine design providing the highest accuracies and throughput.

Avionics
Complex machining for extremely precise parts for fuel injection, combustion chambers, flight controls and gyroscopes.

The Straumann Group

+41 (0)61 965 11 11
www.straumann.com

Founded in 1954, with the introduction of the world's first one-stage dental implant in 1974. More than 35 years of clinical evidence with over 100 scientific publications per year that meet the highest standards of research.

Straumann is the premium offering within the Straumann Group, which unites global and international brands that stand for excellence, innovation and quality in tooth replacement and esthetics.

Headquartered in Basel, Switzerland. Engineering and implant manufacturing in Switzerland, with other production sites for biomaterials and CAD/CAM in Europe, the United States and Japan.

As a global leader in implant, restorative and regenerative dentistry we share your passion for quality and the desire to achieve the best restorative outcomes. In collaboration with leading clinics, research institutes and universities, Straumann conducts research, develops and manufactures dental implants, instruments, prosthetics, as well as dental biomaterials for use in tooth replacement and restoration, or to prevent tooth loss. As technological advancements are changing dentistry fundamentally, Straumann offers a broad range of products and solutions for both conventional treatment and digital workflows including guided surgery, intra-oral scanning and CAD/CAM restorations.

Strohecker Incorporated

+1-330-426-9496
www.strohecker.com

Well-established specialist in the fabrication and repair of copper crucibles, hearths and related equipment used in VAR, ESR, EBM, PAM, as well as various similar processes. Serving producers of the reactive metals and alloys, nickel alloys, refractory metals, and steel alloys.

Structure Medical, LLC

www.structuremedical.com

Structure Medical is a leading medical manufacturer of implants, instruments and cutting tools for the orthopedic, spine and sports medicine markets.

The company uses the most advanced machine tool technology available to produce products that meet the highest quality standards. Structure is an ISO registered 13485 medical manufacturers and offers a robust quality management system that integrates with all facilities.

Structure Medical was founded in Naples, FL in 2004 and has rapidly grown into a strategic partner with top tier OEM's. Today we have 5 production facilities in 3 states.

Sumitomo Corporation of Americas

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www.sumitomocorp.com
shinya.kuriyama@sumitomocorp.com

Sumitomo Corporation of Americas (SCOA) is a wholly-owned subsidiary of Sumitomo Corporation, which is one of the leading trading companies in Japan. SCOA is an integrated global trading firm with diversified investments in a wide variety of industries, products and services.

Supra Alloys, a division of Titan Metal Fabricators

805-388-2138
www.supraalloys.com
sales@supraalloys.com

Supra Alloys is a Titanium Mill Products-stocked Titanium Service Center with the convenience of extensive in-house processing capabilities, with a Management System certified to AS 9100D & ISO 9001:2015 & ISO 13485: 2016. Located in Camarillo, California & Dayton, Ohio USA, Supra routinely provides Titanium for applications in the aerospace, medical, Industrial and sports/recreation industries throughout the world.

The Council for Scientific and Industrial Research (CSIR)

+27-128412600
www.csir.co.za

The Council for Scientific and Industrial Research (CSIR) is South Africa's leading national research and development organization. The Titanium Centre of Competence (TiCoC) within the CSIR has a mandate to develop technology building blocks needed to establish a new South African titanium industry. The TiCoC is developing a suite of complementary technologies to add value to South Africa's vast resources of titanium. This programme primarily focuses on the development and commercialisation of cost-effective processes for primary titanium metal production and its conversion into finished and semi-finished products. The recently established Titanium Pilot Plant situated on the CSIR campus, is an important milestone in this entire process. Parallel to this the TiCoC is developing

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and adapting technologies to consolidate "low-cost" titanium powders into products. Formal collaboration agreements have been signed between the CSIR and global companies such as Boeing, Airbus and EADS. These mutually beneficial agreements support South Africa's long-term economic development goals that include the supply of titanium to many industries, including aerospace.

The Pennsylvania State University

Materials research conducted by iMatSE students and faculty lead to advances and discoveries that become the building blocks of tomorrow. Through formal coursework in small classes and participation in cutting-edge sponsored research, students in the Intercollege Graduate Degree Program in Materials Science and Engineering enjoy a graduate education that prepares them well for their future careers.

iMatSE students receive full funding (stipend and tuition) in the form of fellowships or research assistantships. Program Highlights:

- Penn State ranked #1 in funded materials research in the US (NSF)
- Thesis-based Ph.D. and M.S. degrees
- Multi-disciplinary research programs and centers
- Over 50 MatSE and affiliated faculty members
- Approximately 150 current graduate students
- Specialized laboratories and shared facilities

TiFast

+39 0744 736 307
Irene Brogi, info@tifast.com
www.tifast.com

TiFast is the new European leader in the production of titanium bars, ingots, billets and wires for the aerospace, medical, defence, racing and industrial markets worldwide, with high level of quality, competence and competitive conditions for the most challenging applications.

TiFast, located in Italy, has built a modern titanium plant with state-of-the-art technologies. TiFast has a fully integrated production, including a melting plant, a rolling mill for bars and wires, a precision finishing shop. TiFast has also its own integrated laboratories and R&D facilities.

TiFast can supply titanium bars with very close tolerances, special heat treatments, including stress relieving, with a full range of finishing.

TiFast is certified by the American NADCAP for Aerospace and ISO 13485 for Medical Device. TiFast is also ISO 14001 certified for Environmental, German TÜV ADWO, AS 9100, ISO 9001 and PED for Pressure Equipments.

Timesavers International B.V.

+31 (0) 113 239910
www.timesaversint.com
timesaversint@timesaversint.com

Manufacturer of wide-belt grinding and brushing machines for stainless steel sheet and coil finishing; lasercut, punched, routered and flame cut deburring and edge radiussing; cast iron, ferrous, non-ferrous and titanium high precision calibration. Timesavers is based in Goes, The Netherlands, with regional offices around the globe in Shanghai (China), Taichung (Taiwan), Kuala Lumpur (Malaysia) an Timesavers Inc, in Minneapolis (USA). Worldwide the company has more than 200 employees supported by a network of local dealers and partners.

TIMET, Titanium Metals Corporation

+1 610 968 1300
www.timet.com

First in Titanium Worldwide

Titanium Metals Corporation (TIMET) is one of the world's largest fully integrated titanium producers and the only remaining North American sponge producer. Since 1950, TIMET has been leading the industry in mill and melted products, supplying nearly one-fifth of the world's titanium. We convert rutile ore into sponge; melt and refine ingot and slab; and manufacture mill products. TIMET has a global network of service centers supported by its seven primary melting or mill facilities in Henderson, Nevada; Toronto, Ohio; Morgantown, Pennsylvania; Vallejo, California; Witton, England; Waunarlwydd, Wales; and Ugine, France. With products ranging from sophisticated high temperature alloys used in jet engines, to advanced corrosion resistant alloys used in the chemical industry, TIMET's reach spans the breadth of the titanium applications, and has the technical depth to support developments across a wide range of applications. TIMET's fully integrated supply chain, dedicated research facilities, and decades of experience make us the partner of choice for titanium.

TIODIZE Company, Inc.

+1-714-898-4377
www.tiodize.com

Titanium Anodize, Aluminum Anodize, Dry film Lubricants, Corrosion Coatings, Paints &Primers, Teflon Coatings, Manufacturers of Composite Parts (Carbon & Glass)

TiBrasil Titanio Ltda.

+55 (11)3712-2000
titanio@titanio.com.br

Distributing new and top quality titanium, in metallic form, in raw material (plates, tubes, rods, rods, etc.), components, complete equipment and/or services is the purpose of Tibrasil Titânio Ltda.

The key to our success is to provide the best service to our customers, whether in the analysis of titanium applications, and/or in the supply of materials and manpower. Tibrasil Titânio Ltda. has an exclusive source of accumulated know-how, which since 1972 in Brazil has been solving various problems.

In addition to titanium, Tibrasil Titânio Ltda. has in its product line, similarly, the Niobium, Tantalum and Zirconium.

Enjoy the benefits of being a registered customer with cumulative advantages.

The staff of Tibrasil Titânio Ltda. is highly trained to serve you. Because titanium is a metal with ingenious applications, we are already waiting for your specific idea and/or problem.

Tibrasil serves a wide range of industries including petroleum refining, petrochemical, chemical, pulp and paper, metal refining, pharmaceutical, bio-medicinal, surface treatment, mining, steel, pollution control, among others.

Producers, Distributors, Fabricators, OEM's, & Vendors to the Industry

TITANIUM Consulting & Trading S.r.l.

+39-055-642543
www.tct.it
info@tct.it

Certified UNI EN ISO9001:2008 and UNI EN 9120:2010, With 20 years of experience, Titanium Consulting and Trading, based in Florence, Italy, with a distribution center in Milan and affiliated offices and distribution centers in both Germany and England, is a privately owned stockist/distributor of titanium mill products.

Being a major supplier in the European market for titanium mill products and its alloys, we can guarantee a prompt delivery for products including ingots, slabs, round bars, hexagonal bars, profiles, welding wire, plates, sheets, coils, tubes and pipes, as well as fasteners, forgings, flanges and fittings. Most ex-stock materials are shipped the next working day with full traceability for all items supplied

Products supplied are employed in a wide range of applications, including aerospace, medical devices, industrial, and chemical.

In 1996, Titanium Consulting & Trading further expanded its operations by setting up dedicated facilities to manufacture finished products on request. Processes available include cutting, welding, forming, turning, heat treatment and finishing.

TITANIUM ENGINEERS

+1-281-265-2910
www.TitaniumEngineers.com

TITANIUM ENGINEERS supplies Titanium Bar, Seamless Tubing and Finished Components for oilfield and other industrial markets. Our capabilities include the expertise to process titanium to meet demanding and unique customer specifications. We specialize in bar, seamless titanium tubing and also offer products manufactured by: forging, rolling, and machining using common ASTM grades of titanium including: Titanium Grade 5, Titanium 6-2-4-6, Titanium Beta-C. With our metallurgical background we will support your team from design, through prototyping, and finally into full-scale production of components.

Titanium Fabrication Corporation

+1-973-808-4961
www.tifab.com
bbrownlee@tifab.com

A World leader for over 45 years in the application, design and fabrication of quality Titanium and Zirconium process equipment, whether solid or clad construction. Extensive experience in rotating, offshore, marine or ordinance equipment. Most extensive titanium field welding/erection service capability in the world. Mill products available from stock. For more information email bbrownlee@tifab.com.

Titanium Finishing Company

+1-215-679-4181
www.titaniumfinishing.com
melinda@titaniumfinishing.com;
melanie@titaniumfinishing.com

Metal finishing services include: Titanium Anodize; Hardcoat Anodize of Aluminum; application of Cerakote and Application of Solid Film Lubricants. We also have our Federal Firearms License. We are a small, women owned business, and have been family owned and operated since 1970.

Titanium Industries, Inc. (T.I.)

1-888-482-6486
www.titanium.com
sales@titanium.com

T.I. is the global leader in specialty metals supply for the aerospace, medical, industrial and oil & gas markets. Holding the world's most complete inventory of specialty metals across a global service center network, T.I. delivers supply solutions at all levels of sophistication and complexity. With a globally experienced and technically driven team, T.I. has been providing dependable, quality driven service to our customers since 1972.

Titanium International Group SRL

+39-051-6814893
www.titanium.it
tig@titanium.it

TIG is an European stockist and distributor of Titanium, Nickel alloys and Steels for Aerospace, Medical, Automotive and other high demanding end use markets.

TIG is EN9100 and EN9120 certified and has several customers approvals. TIG provides cut to size services with more than 30 saw cut machines and 3 dynamic waterjet cut machines.

Contact us for a quotation! Your mission is our priority!

Titanium Processing Center

+1-888-771-9449
www.titaniumprocessingcenter.com

AS 9100 and ISO 9001 certified, Titanium Processing Center is your go to source for quality titanium products. Titanium Processing Center is a stocking distributor of a wide range of titanium mill products. Our standard inventory of titanium bar, sheet, plate, tubing and pipe is complimented with specialty fasteners, fittings, forgings and fabrications. In-house capabilities include waterjet & saw cutting, shearing, turning and drilling.

All material is mill certified and fully traceable to the original manufacturer. Our dedicated staff is committed to providing our customers with the courteous and prompt attention that they deserve. Delivering quality products on-time and in compliance with your requirements remains our priority at Titanium Processing Center.

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TITOMIC Limited
+61 3 9558 8822
www.titomic.com
info@titomic.com

Titomic is an Australian additive manufacturing company enabling industrial scale manufacturing from titanium and other metals using its patented process; Titomic Kinetic Fusion™.

Co-developed with CSIRO, Titomic's process overcomes the limitations of additive manufacturing (3D printing) melting technologies of metals to manufacture complex parts without shape and size constraints.

Advantages include:

- World's fastest build rates - 30 times faster than the largest commercial 3D printers available
- Create superior materials by fusing dissimilar metals and blended alloys
- Production volumes without tooling
- Stronger structures without welding, folding or bending
- Reduced time to market; faster manufacturing time & localized production
- Lower production costs while using fewer resources

Titomic provides surface engineering, end-to-end production support; equipment, prototyping, product testing, manufacturing modelling, technical support and maintenance.

TMS Titanium
+1-858-748-8510
www.tmstitanium.com
info@tmstitanium.com

TMS Titanium is a leading supplier and stocking distributor of titanium mill products to a variety of industries including, aerospace, medical, racing and commercial. By combining product and industry knowledge, commitment to specialty industries, access to titanium and reliable inventory, TMS is able to consistently provide titanium to its customers in order to keep their production moving forward. TMS works with their trusted network of suppliers, finishers and fabrications to fulfill their customers' specific titanium needs, while producing the best quality products available.

Toho Titanium Co., Ltd.
+81 467 87 7023
www.toho-titanium.co.jp

Toho Titanium Company, Ltd. manufactures titanium metals such as premium quality titanium sponge for aerospace and other applications, titanium ingot (CP and Alloy), high purity titanium ingot/billet for semiconductor industry and electronic materials including high purity titanium dioxide and ultra-fine nickel powder etc.

Trepanning Specialties, Inc.
+1-562-633-8110
www.trepanningspec.com

Trepanning & machining services. Specializing in hollow bar conversions to pipe, tube, ring and sleeves. Size capacity up to 55" O.D., 21" I.D yielding a 26" core & can saw cut up to 22". Work with stainless steel to more "exotic" high temperature materials like Titanium, as well as non-metallic materials such as plastic and wood. Full machine shop offering trepanning, gundrilling/BTA, turning, saw-cutting, facing & specialty emergency services. We offer blind shipments. Material can be provided. Family run and Veteran owned since 1973. Contact us via phone (562)633-8110 or email: trepan spec@yahoo.com.

Trent Titanium Limited
+44-1246-290655
www.trent-ti.co.uk
Daniel.nix@trent-ti.co.uk

Processor of titanium scrap for all sectors of Titanium.

Tricor Metals
330.264.3299
www.tricormetals.com
info@tricormetals.com

Introduction
We are a woman-owned, small business with facilities in Wooster, OH, Conroe, TX, Plymouth, MI and Oxnard, CA with over 25 years' experience in the supply of titanium mill products, titanium forgings and fabrication of ASME Code equipment for the petrochemical, pharmaceutical, mining, aerospace, and bio-medical served markets.

What we do
We provide quick-ship service center sales and processing of ASTM and AMS grades of titanium mill products and titanium forgings. We also design and build fabricated process equipment built with the most advanced corrosion resistant metals, provide reactive metal and high alloy welding repair services, and supply high performance Astrolite® welding wire.

Where are our facilities
Our fabrication and distribution facilities are in Wooster, Ohio and Conroe, Texas. We process and distribute aerospace grade welding wire from our Astrolite Alloys division in Oxnard, CA. And we operate a technical sales office in Plymouth, MI.

Titanium mill products & custom forgings
We maintain one of the world's most complete inventories of titanium mill products in ASTM grades for corrosion including sheet, plate, pipe, fittings, bar, billet, wire, tubing, and fasteners. And we maintain staged billets for custom forgings. We offer advanced processing including water jet cutting, saw cutting, and shearing. We provide custom parts manufacturing and just-in-time inventory for 'blanket' order processing to meet our customer's needs. We stock AMS-grades of titanium sheet, plate, bar and billet for aerospace and bio-medical served markets.

Fabrication of advanced corrosion resistant metal
In our ASME code shops in Ohio and Texas we build custom process equipment including: tanks, towers, pressure vessels, piping spools, shell & tube heat exchangers, plate and frame heat exchangers, and custom

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welded parts. We specialize in advanced metals for solving corrosion such as titanium, tantalum, zirconium, niobium, nickel alloys, duplex stainless and stainless steel.

Field and factory weld repairs
Our repair teams can be mobilized globally for field work. Or we can repair in our facilities. We specialize in welding of advanced corrosion resistant metals like titanium, tantalum, zirconium, niobium, nickel alloys, duplex stainless and stainless steel. Available with 24 hour notice for emergency repairs.

Astrolite® Alloys - Welding wire and titanium for aerospace
We stock, process, clean, process, and package Astrolite® UltraGrade™ high performance welding wires for aerospace, power, and turbine engines.

TSI | ChemLogix
800-874-2811
www.tsi.com/metal-analyzers/
answers@tsi.com

TSI | ChemLogix manufactures handheld and online laser based metals analyzers. The TSI Chemlite™ Laser Metals Analyzer is a handheld instrument that will measure Al, Mg, and Ti in as little as one second. Ergonomically designed, industrially-hardened and inherently safe, the Chemlite is the only regulation free handheld for measuring Titanium. Verify or sort your Titanium on the spot with ease and confidence. The Chemline process sensor can be utilized in an online scrap sorting system. TSI can provide sensors or turnkey solutions to fit your specific application.

TZMI, Inc.
+1 281 956 2500
www.tzmi.com marketing@tzmi.com

TZMI is an independent consulting company that works with a wide range of global clients to provide insight and expert advice on opaque mineral, metal and chemical sectors. Our uniqueness is that TZMI contains technical and operational experience, together with strategic and commercial competency, to provide a full service offering to our clients.

As trusted advisors, our reputation is underpinned by having an experienced cross-section of technical specialists around the globe. TZMI partners with clients from the private and public sectors to provide bespoke solutions across markets and strategic services; and also technical and engineering services. Our clients range from the world's 500 largest companies through to mid-sized companies and small businesses.

TZMI regularly releases market reports and periodicals on relevant subject matters which support the consulting activities and ensure up-to-date, high quality and comprehensive data, analysis and information is provided. TZMI annually hosts the largest titanium and zircon industry conference. Email: marketing@tzmi.com

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Ulbrich Stainless Steels & Special Metals, Inc.
+1-203-239-4481
www.ulbrich.com
information@ulbrich.com

Ulbrich Stainless Steels & Special Metals, Inc., is a leading processor of a variety of different alloys including, but not limited to: stainless steels, PH grades, nickel and nickel alloys, cobalt alloys, niobium, zirconium, titanium and titanium alloys. Commercially Pure Titanium: Grade 1, Grade 2, Grade 3, Grade 4, and Titanium Alloys: Grade 9 (Ti 3-2.5), Ti 15.3.3.3 and 21s (Ti Beta21s), as well as the aforementioned metals are available in strip, foil, flat, round and shaped wire. Nitinol, Grade 5 (Ti 6-4) and Ti 6.2.4.2. are available in limited widths at Ulbrich. Please inquire for more detail on all of our product offerings.

United Alloys & Metals, Inc.
+1-562-273-7004
www.uametals.com

United Alloys & Metals is one of the World's leading processors of all grades and forms of Titanium Scrap for all Titanium applications. Both our Santa Fe Springs, CA and Columbus, OH plants have full processing capabilities and are certified to ISO 9001:2000 standards.

United Performance Metals
888.282.3292
www.upmet.com
sales@upmet.com; sales@upmet.uk

United Performance Metals (UPM), an O'Neal Industries affiliate company, is a global distributor of high-performance metals serving customers in a variety of industries, including aerospace, fastener, medical, power generation, oil and gas, semiconductor and many others.

UPM offers a comprehensive inventory of products, including Stainless Steel, Nickel Alloys, Cobalt Alloys, Cobalt Chrome Moly, Titanium, Duplex Stainless Steel, PRODEC®, Aluminum, and Alloy Steel in coil, sheet, strip, plate, bar and near net shapes.

FIRSTCUT+® Processing Services include slitting, shearing, cut-to-length, leveling, edging, laser gauge measurement, sawing, precision cold saw cutting, laser cutting, water jet cutting, plasma cutting, precision blanks, boring, trepanning, chamfering & facing, deburring, first stage machining, heat treating and ultra-sonic testing.

Our certifications include AS9100D, AS9100C Belfast, ISO 9001:2015, ISO 9001 Belfast, ISO 13485, GE Aviation S1 (S1000), Pratt & Whitney LCS and laser cutting approvals NADCAP AC7116, and GE S422.

United Performance Metals is headquartered in Cincinnati, OH and maintains nine service centers worldwide including Oakland, CA, Los Angeles, CA, Hartford, CT, Chicago, IL, Greenville, SC, Belfast, Northern Ireland, Budapest, Hungary, and Singapore.

Uniti Titanium
+1-412-424-0440
www.uniti-titanium.com

Uniti Titanium brings together two major global titanium producers with complimentary manufacturing and technical capabilities, Allegheny Technologies Incorporated (ATI) of the United States, and VSMPO-Avisma (Verkhnaya Salda Metallurgical Production Association - Berezniki Titanium -Magnesium Works) from Russia, to create a joint venture focused on titanium mill products for industrial and other non-aerospace, non-military and non-medical markets. Uniti Titanium integrates the synergistic use of raw material, melting, hot rolling, finishing, research and technology resources of the two companies.

Producers, Distributors, Fabricators, OEM's, & Vendors to the Industry

Verder Scientific, Inc.

President, Georg Schick:
(267) 757-0351 ext. 160
www.Verder-Scientific.com
Info-us@Verder-Scientific.com

Verder Scientific Inc., comprised of the Retsch, Carbolite Gero, and ELTRA brands sets the standard in high-tech scientific equipment serving research institutions, analytical laboratories as well as manufacturing companies for decades. The company manufactures and supplies instruments for sample preparation, elemental analysis as well as heat treatment of solid materials.

Verichek Technical Services, Inc.

+1-412-854-1800
www.verichek.net
Sales@verichek.net

Verichek Technical Services, Inc. is an ISO/IEC 17025:2017 Accredited Laboratory for PMI Testing, Hardness Testing, and OES Calibration. We provide a value-added service to our customers in the form of Training, Preventative Maintenance, Spare Parts, Service, Repair, and Calibration of OES Instrumentation. As a third party service and calibration provider to businesses in the metals industry, we also offer the best and highest quality OES, XRD, and Retained Austenite Measurement Instrumentation from GNR. Additional offerings include rental and refurbished instrumentation for cost-effective solutions to our customers. Visit our site or call us to learn more!

Vested Metals International LLC

904-495-7278
www.vestedmetals.net
info@vestedmetals.net

Vested Metals International is an ISO 9001 and AS9100 certified raw material specialty metals distributor with decades of experience specializing in hard to find alloys, grades, and sizes. We offer various grades of stainless steel, titanium, tool and alloy steels, aluminum, and high temperature nickel and cobalt based alloys. We pride ourselves on helping customers meet and exceed niche requirements.

VSMPO – AVISMA

+7-34345-55764
www.vsmpo.ru

VSMPO-AVISMA, the world's largest producer of titanium, holds more than 300 international quality certifications and approvals at major aerospace OEMs and medical device companies. VSMPO-Tirus operations in the US, the UK, Germany and China provide regional sales, distribution and service center processing.

VSMPO - Tirus, US

+1-720-746-1023
www.vsmpo-tirus.com

VSMPO-Tirus, US is the North American sales and distribution division of VSMPO-AVISMA, the world's largest producer of titanium, holding more than 300 international quality certifications. VSMPO-Tirus US distributes ingot, forgings, slab, sheet, plate, bar, and billet to the aerospace, medical, and consumer products industries. VSMPO-Tirus US also manufactures small diameter bar and coil for medical and aerospace fastener applications.

VSMPO - Tirus China Ltd.

+86 10 8455 4688

VSMPO-Tirus China ltd. is the Chinese sales and distribution division of VSMPO-AVISMA, the world's largest producer of titanium, holding more than 300 international quality certifications. VSMPO-Tirus China distributes ingot, slab, sheet, plate, bar and billet to the aerospace, medical, and consumer products industries.

VSMPO Tirus GmbH

+0049 69 905477-25
www.vsmpo.de

VSMPO TiRus GmbH is responsible for the sales and distribution of titanium semi-finished products in Europe (except the UK), Brazil and Israel to the aerospace, medical and automotive industries. The company was established in 1999 in Frankfurt/Main. The German affiliate of the largest vertically integrated international titanium producer VSMPO-AVISMA offers optimum service, including custom-made processing of semi-finished products as well as a comprehensive transport service. We offer cut-to-size material (bars, billets, sheets and plates) to meet our customers' individual operational needs. TiRus GmbH also distributes electrodes, ingots, rolled rings and different types of forgings.

VSMPO Tirus UK Ltd.

+(0) 1527 514111

VSMPO Tirus UK Ltd. is the UK's sales and distribution division of VSMPO-AVISMA, the world's largest producer of titanium, holding more than 300 international quality certifications. Tirus UK distributes ingot, forgings, sheet, plate, bar, and billet to the aerospace, medical, and consumer products industries.

VSMPO Titan Ukraine Ltd.

+380 562 313092
www.tw-vsmpoavisma.com

VSMPO Titan Ukraine Ltd. is fabricator of seamless tubular products from titanium and its alloys. It is a part of the world's largest producer of semi-products and finished titanium products - JSC Corporation VSMPO-AVISMA (Russia) which supplies billets and bars to the plant. It is guarantee of quality competitiveness of manufactured production for the customers. Annual production capabilities of the enterprise is 700 tons of cold-finished titanium tubes (diameter 3-134 mm and wall thickness 0,2-9 mm), and in cooperation additionally 200 tons of hot-finished titanium tubes (outside diameter 169-325 mm and wall thickness 7-30 mm). Engineers and technical specialists are developing new technologies of titanium tubes production and new types of products. For example, octahedral and ribbed tubes, special kind of thin tubes for silphons, technologies of long-length tubes production, etc. VSMPO Titan Ukraine Ltd. has all equipment necessary for different tests and QA inspections. It allows manufacturing not only according to the international and national standards, but meeting any customer's requirements.

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Webco Industries
+1-918-245-2211
www.webcotube.com
titanium@webcotube.com

Webco delivers North America's widest range of tubular products, rapidly fulfilling urgent orders and helping customers avoid costly unscheduled shutdowns and production delays. Customers in the aerospace, automotive, chemical processing, industrial, oil & gas, power generation and other industries, rely on Webco's strength, agility, and innovation to deliver solutions for their most challenging requirements. In fact, Webco manufactures and distributes millions of feet quality tubing made to meet today's most demanding specifications.

Our welded and seamless titanium tube products are available in variety of grades and sizes, standard/off-the-shelf or tailored to meet customers' unique requirements.

Webco maintains a culture for relentlessly pursuing process and product excellence, enabling ever-improving productivity/product quality. For a current list of our ISO, PED, and other certifications as well as ASME, ASTM, and other specifications offered, visit webcotube.com.

Weber Metals, Inc.
+1-562-602-0260
www.webermetals.com

Weber Metals, Inc. specializes in Aluminum and Titanium open and closed die forgings for the Commercial and Military Airframe, Air and Land Turbine, Nuclear and Semiconductor industries. Our press sizes range in size from 1200 to 33,000 tons. We have capabilities to perform heat treatment, non-destructive and destructive testing in house. Our forgings range in size from 1 pound to 11,000 pounds. Our aluminum stress relieved forgings are some of the most stable products in the industry for machining.

Wellmet International Inc.
+1-909- 594-9639
www.wellmetusa.com

Wellmet is located in California USA and we have been supplying and distributing Titanium Sponge and Titanium Powder for more than 20 years. We can also supply other non-ferrous metals with approved quality. Our Titanium Sponge producer is ISO9001:2008 certified and sponge quality is approved by world main consumers.

Westbrook Light Alloys Ltd.
+44-1246-292292
www.wbrl.co.uk

Buyers and seller of titanium scrap. All grades and forms of Ti scrap bought for use in UK production of Ferro Titanium for sale worldwide to end users. Standard and special grades produced to order with all packing and sizing options available to satisfy customer requirements. We also buy/trade titanium scrap for upgrading, processing and on sale.

West Penn Testing Group
+1-724-334-1900
www.westpenntesting.com

West Penn Testing Group is a full-service, independent testing laboratory with diverse inspection and testing capabilities since 1952. They provide an extensive array of non-destructive, chemical, metallographic, failure analysis and mechanical evaluation services, serving customers in these industries: aerospace, medical, power generation, commercial, military, raw materials, refractories, oil and gas, and the automotive industry. They have three locations in New Kensington, Pennsylvania and Richburg, South Carolina and perform testing nationally and internationally. Their 79,000 sq. ft. facilities accommodate parts up to 20,000 lbs. www.westpenntesting.com

Western Superconducting Technologies Co. Ltd.
+86-29-8651-4505
www.wstitanium.com
dxh@c-wst.com

Western Superconducting Technologies Co., Ltd. (WST), founded in 2003, is headquartered in Xi'an, China. WST is leading supplier of titanium and its alloys material including Ti6Al4V, Ti6Al4V ELI, Ti6242, Ti6246, Ti662, Ti811, Ti38644, Ti1023, Ti6Al7Nb, NbTi in the forms of ingot, billet, forging, slab, bar, rod, wire and profile in the domestic & oversea market. Our products are mainly used in aerospace, medical, automotive industries and other critical industries.

WST possess most advanced 10 tons VAR furnaces and series of high speed forging presses to manufacture 6000 tons ingots and 4000 tons bars per year. We have gotten the certificate of ISO 9001, AS 9100, NADCAP and ISO 14001, strict quality control system make largest assurance for our high quality products. WST's titanium alloy bars hold over 85% domestic aerospace market.

Western Titanium Technologies Co., Ltd.
+86-029-86968668
www.c-wtt.com

Western Titanium Technologies Co., Ltd (WTT) was established in 2004. It is a large scale and high-tech state-owned company specialized in the developing and producing Titanium, Zirconium, Nickel and their alloy materials and supplying them around the globe in the chemical industry and power generation, aerospace and turbines, oil and gas, Medical, and

Military.
Based on almost completely production process from melting, forging and rolling, we mainly produce semi-finished products and pre-materials in the form of ingot, forgings, bars, plate and sheet, seamless tube and pipe in titanium and titanium alloys, zirconium and nickel and nickel alloys.

As the largest subsidiary company of Western Metal Materials Company (WMM), we will rely on more than 50 years research experience, innovative spirit and inspection plant to continuously increase market demands, broader application ranges and supply high qualified products.

Producers, Distributors, Fabricators, OEM's, & Vendors to the Industry

Westmoreland Mechanical Testing & Research

+1-724-537-3131
www.wmtr.com
us.sales@wmtr.com

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Wyman Gordon is a worldwide supplier to the aerospace and industrial gas turbine markets. We hold quality accreditations for all of the major airframe and engine manufacturers for both civil and military applications. Wyman Gordon creates rotating closed-die forgings which are critical for aerospace and land-based gas turbines. Wyman Gordon also manufactures structural forgings for airframe, nuclear, petrochemical, power generation, and space applications.

Xi'an Metals & Minerals Import & Export Co., Ltd.

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info@tiwmo.com; wxd@tiwmo.com; hj@tiwmo.com

As a leading manufacturer and distributor of Titanium, Molybdenum and Tungsten products in China, Xi'an Metals and Minerals Import &Export Co. Ltd., has joined into manufacturing, researching and competing in Titanium industry. We supply Titanium and its alloys in various forms as per ASTM, AMS and other main internationally recognized specifications. Our advantage is the most competitive prices as well as guaranteed high quality! Our products are exported worldwide, and gained high reputation because of their excellent performance.

ZIROM S.A.

+40 246 216666
www.zirom.ro
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The products manufactured, ingots and forged semi-finished products, are intended both for cutting edge fields (aviation and nuclear areas) and various fields (metallurgy, chemical industry, medical technique and devices).

The ZIROM's integrated management system (quality, environmental, health & safety) and the ZIROM's products are certified by LRQA in accordance with the following standards: ISO:9001:2008, EN 9100:2009, ISO:14001:2005, OHSAS:18001:2008, NORSOK M-650 .

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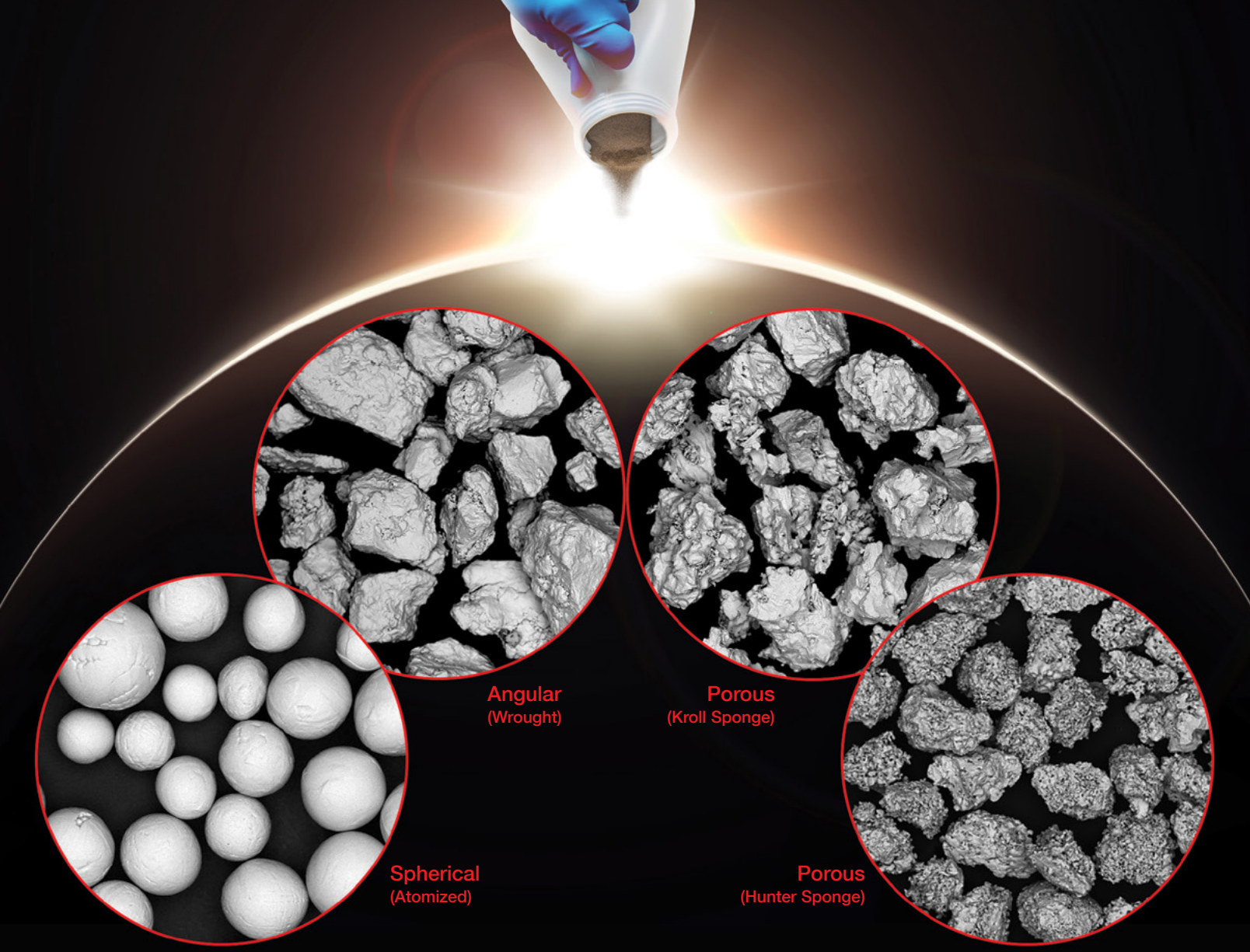

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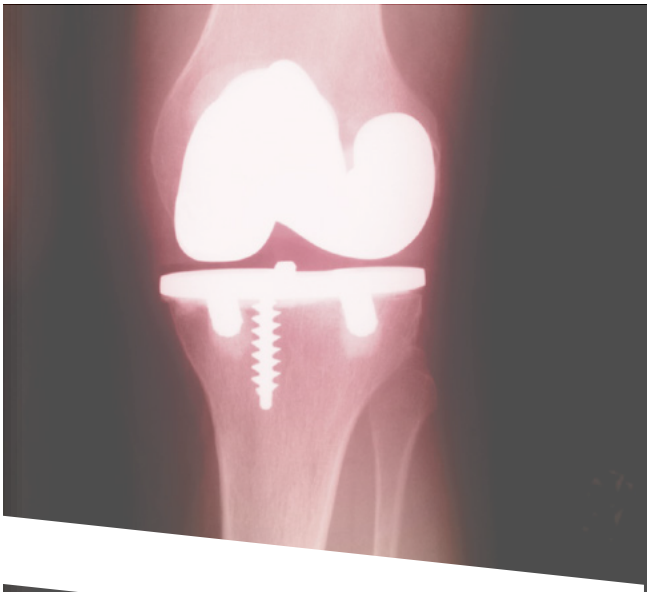

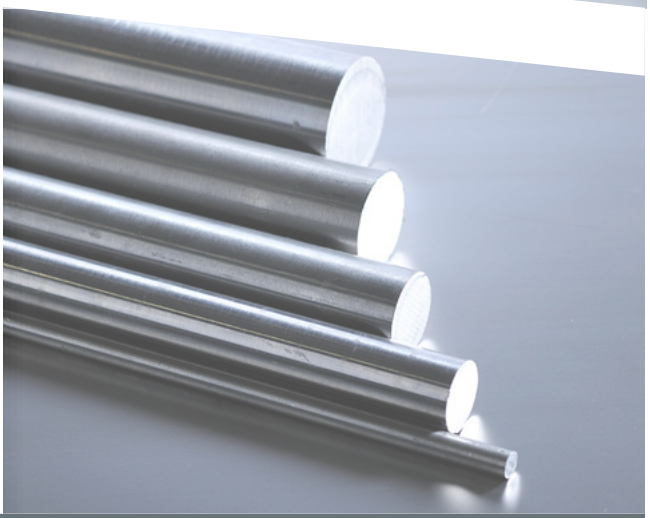

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- 316L
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