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THE SPOTLIGHT

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Vacuum Nitriding

Solar has over 20 years experience ion nitriding to surface harden parts for improved wear life. With a new furnace and nitriding capabilities, Solar now offers vacuum nitriding with gas as well as ion or plasma nitriding. The benefit is that more materials and parts, with simple or complex geometries, can be surface hardened.

Depending on the alloy processed, Solar's vacuum nitriding increases the surface hardness by 40% - 70%! To preserve part specifications, vacuum nitriding's controlled, low temperature processing (between 850°F - 1400°F) minimizes any inherent part distortion. Metallurgically, the surface hardness depth (.001- .020) preserves the core strength and durability while improving fatigue resistance and anti-galling properties for adhesive and abrasive wear.

The *ion nitriding* version of Solar vacuum nitriding *results* from a reaction caused by a high voltage glow discharge between the metal processed (the cathode) and the vacuum chamber's wall (the anode). Operating parameters such as applied voltage, vacuum level and nitrogen ions cause a reaction with the metal alloys to form the nitrided surface.

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New Gas Vacuum Nitriding Furnace

Solar California

Solar's dream of an operating plant in Southern California is moving closer to reality. In fact, operations are planned to begin the third quarter of 2009 in Perris, CA at a refurbished 50,000 square foot building. Negotiations to purchase a plant are in their final stages. Even with the struggles of the California, American and global economies, Solar anticipates a third quarter upswing in manufacturing, and thinks this is the right time to move.

Derek Dennis, President, has been busy with negotiating, planning, interviewing and a myriad of other activities required to open the new plant. The excitement he loves is seeing the pieces of the puzzle come together. Completing the plant purchase will certainly put a big piece of the puzzle in the right place. Located southwest of Los Angeles, the large plant with high ceilings will allow for an immediate start-up when the utilities and furnaces are operating.

A new Solar Manufacturing 24 foot long furnace (60" wide x 60" high x 288" deep) will be assembled at the plant site and will be operating this fall. Two bar quenching with 2650°F maximum operational temperature and 50,000 lb. capacity gives Southern California a new resource for vacuum heat treating and brazing. The first small furnace will be shipped ready to operate, and after installation, will process the company's first orders in its 40" wide x 36" high x 50" deep hot zone. This furnace will have 10 bar quenching with the ability to vacuum carburize. Other smaller furnaces will be shipped later in the year.

The dream is becoming a reality. It is quite a commitment by Solar's ownership, but the risk is worth the opportunity to bring Solar's Vacuum Thermal Processing expertise and furnace capabilities to the West Coast. There will be an update in the April issue of the **eSpotlight** (see article on page 3.)



The Silver Year

The silver decal you see on our business communications is in recognition of Solar Atmospheres' 25 years of achievements. Solar Atmospheres will be celebrating its 25 years in 2009 with various activities and events.



William R. Jones established Solar in 1984 with the wits and know-how to develop a vacuum heat treating plant. He partnered with his wife and business counselor, Myrt Jones, and the family-owned business has expanded into multiple divisions: Solar Atmospheres, Solar Atmospheres of Western Pa, Solar Manufacturing, Magnetic Specialties and now, Solar Atmospheres of California.

A special anniversary issue of the Spotlight will be published in June. Exclusive interviews, lessons and events will be captured in this special feature along with a sneak preview for what the future holds.

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MISSION

The Mission of Solar Atmospheres is to add significant value to our customer's operations by thermally treating parts, principally in a vacuum environment, with an unwavering commitment to honesty in all relationships.

We will strive to fulfill this mission while...

- Performing our work with an emphasis on quality and responsiveness
- Operating with an awareness and appreciation of the value of our customer's parts while in our care
- Forever looking "forward" in the area of technical capabilities
- Demonstrating a willingness to "accept the challenge"
- Providing and maintaining a work environment that is safe, clean and reflects our respect for human dignity.
- Providing our employees with an opportunity for personal growth, challenge and reward
- Maintaining a workplace that is environmentally friendly
- Sustaining long-term growth and profitability

The Spotlight is a quarterly publication of Solar Atmospheres

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William R. Jones

Corporate President
Roger A. Jones

President, Hatfield Facility
A. Bruce Craven

President, Western PA
Robert Hill, Jr.

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All Eyes on Quality

QC or QA - What's the Difference?

Quality Control (QC) is maybe the most familiar "quality term" and can be traced as far back as the ancient Egyptians, who managed to build the Great Pyramid of Giza with the four sides of its base perpendicular within 3.5 arcseconds (an arcsecond is 1/60th of one degree!). Certainly there were people responsible for the characteristics of the structure and they were early quality inspectors.

Quality Control, however, did not become a documented concept until the industrial revolution, when mass production and piecework led to bad workmanship. To counter this bad workmanship, full time inspectors were introduced into the factory to identify and remove defective product. Quality control by inspection in the 1920s and 1930s led to the growth of quality inspection functions, separately organized from production and usually with the "power" to halt production should bad workmanship occur.

Sometime around World War II people learned that you can't inspect certain qualities *into* a product, so additional techniques were developed utilizing statistical analysis tools, such as control charts and sampling plans. The goal was to catch the same defects at less cost. This was eventually coined as **Statistical Quality Control (SQC)**. These techniques were largely used in the U.S. well into the 1980s, and are still evident today.

After World War II General Douglas MacArthur, while overseeing the rebuilding of Japan, involved two key individuals named W. Edwards Deming and Joseph Juran. They promoted quality concepts that were later called **Quality Assurance (QA)**. Whereas Quality Control emphasizes inspection to prevent the release of defective product, quality assurance is about improving production techniques to prevent defects from occurring. Ironically the Japanese embraced these concepts while the U.S. and other industrial nations continued to apply traditional QC concepts focused on removing defects, and ignoring the QA



concepts that the Japanese were busy perfecting (Toyota, Honda, etc).

In the 21st century, the emphasis is now placed on the development of a **Quality Management System (QMS)** with the ultimate goal of **Continuous Improvement** and **customer satisfaction**. The QMS is comprised of policies, objectives, procedures, and people, and is typically registered to a standard, such as ISO9001 or ISO17025, by a third-party registrar. If a company is registered to one of these standards it means a potential customer can expect a commitment to continuous improvement and customer satisfaction. Registration, however, does not guarantee high quality, only that the organization strives to meet the requirements of the standard.

Today's QMS encompass most of the past concepts learned by the human race, going back to the early days of man trying to emulate God by being creative. We build a future based on the lessons of yesterday and embrace new quality concepts as they prove their worth.

Mike Moyer, Corporate Quality Manager

"Quality in a service or product is not what you put into it. It is what the client or customer gets out of it."

Peter Drucker

Experience & Wisdom

Experience can lead to wisdom. It is not a given, but with motivation and purpose, people grow in knowledge and gain perspective and insight on achieving good outcomes in life. The Proverbs of Solomon speaks of the relationship; "Long life is in her [wisdom's] right hand: in her left hand are riches and honor. Her ways are pleasant ways, and her noble paths are peace. She is a tree of life to those who embrace her, those who lay hold of her will be blessed."

Experience at work can also lead to wisdom that benefits customers and the employer. Experienced employees often bring a special wisdom to each project. Solar recognizes this benefit from service longevity and therefore promotes training and offers rewards for its employees' years of service. This past November, Solar rewarded employees in Eastern and Western PA for their continuing service to our customers and the company.

Five Years

Kevin Barbarossa*
Jeremy Greer*
Todd Keep*
Mark Kremm*
Nickolas Kliem*
Lyle Peterson*
Steve Schmitt

Ten Years

Kevin Bekelja
Carl Seidel
Willard Kramer
Jim Albright
Jeff Stellman*
Ken Bauhof
Trevor Jones

Fifteen Years

Mike Drakeley
Don Jacobs
Chuck Siegfried

*Western PA



Twenty Year Employees

Mark Carper* Dan Wornham Calvin Amenheuser

Vacuum Nitriding continued from page 1

Solar's new process, *gas nitriding*, surface hardens ferrous materials by processing parts below the austenitic temperature. The part surface is diffused with dissociated ammonia (nascent nitrogen, NH₃) in the vacuum furnace. The result is a hard, wear resistant surface.

Coming on line this month (February) a new gas nitriding furnace will process loads up to 1,000 lbs. The Solar Manufacturing furnace, 36" wide x 42" long x 30" high, will feature several

innovations. The vacuum chamber will enable precision processing with microprocessor controls for the temperature, gas flow and cycle times. Trevor Jones, who oversees the new process, explains; "The value of microprocessor control is repeatability from load to load; no manual operator interface. This inherently leads to controlled case depths and optimal case structures."

Call Solar (800.347.3236) or email (info@solaratm.com) to discuss the best nitriding alternative for your application. Solar's sales engineers are eager to be of assistance. For more information, please visit www.solaratm.com/services/vacuum_nitriding

The Spotlight / eSpotlight

Graphic changes visibly express newness and development. These attributes are a reality at Solar Atmospheres. Our logo represents our steadfastness to our core mission and values, however, a new graphic style represents the advancement of applications and our development. A consistency in graphic style represents a unity of purpose in the company.

The *Spotlight*, as you have noticed, has a new look in line with Solar's new brochure. Not only does Solar's 13 year old publication have a new look, but it will also enter into the medium of "e-letters" with the new *eSpotlight*. The printed *Spotlight* will be sent to you three times per year instead of four, and the *eSpotlight* will be sent three times if you desire to receive it. Every other month you can receive a communication about Solar and its services. If you receive the *eSpotlight* and do not want it, an opt-out link will be provided. The *eSpotlight* will begin this April.

Other than its new look, The *Spotlight* will have the same editorial goal of informing our customers and friends about Solar developments, its people and the world of heat treating. The **eSpotlight** will be emailed to those have supplied their email addresses to Solar. It will be concise, with follow-up articles from the previous *Spotlight* and timely updates on Solar activities.

**To receive the eSpotlight
three times per year,
please email us at
spotlight@solaratm.com
and ask to be put on
the email list.**

Please include your name, company, phone number and e-mail address.

Medical Implants

Long-term contracts and knowing you will have work for the next day is a luxury for heat treaters. Customers and jobs daily come and go, so it is most welcome when Solar has a customer who regularly sends in parts.

The baby boomers are starting to retire and as joints wear out and arteries clog, surgical implants have become essential for this age group. Consequently, Solar's vacuum heat treating has become an important part of the supply chain for the implant business.

Cobalt, chrome, molybdenum implants for knee and other joints come in bins to be fully annealed. The strong and tough implants arrive at Solar after hot isostatic processing known as hiping. Using intense pressure and heat on a powder metal part, the basic shape is formed. However, the parts are too hard for machining and require an annealing process.

A number of Solar's furnace operators are involved with the medical implant work, but a key person is Jan Barlow. Jan is a well suited with her attention to detail. Each implant is tracked so Jan and other operators know exactly what comes in and goes out after annealing. There can be as many as 1000 implants annealed in a single furnace run.

Another implant process involves heart stents, which are very fragile and require extremely careful handling and inspection. Jan is one of three operators who handle these 316L implants. White gloves are a requirement and each stent is placed in a plastic bin slot with a specialized wire handling tool.

Jan retired from 20 years in Kenya at the African Inland Mission's Rift Valley Academy, and needed a job. When the opportunity came to work on the shop floor, Jan applied and became a furnace operator and enjoys the new position. In particular, she appreciates the necessity of always being on alert when operating the furnaces. Furnace programming, part set ups, monitoring and packaging are constant challenges and provide plenty of

diversity for her day. As stated in this Spotlight, "Excellent customer service by Solar people keeps the work on track and coming in."



Jan Barlow with a double load of implants

The Silver Year

continued from page 1

In order to commemorate Solar's quarter century of growth and success, a 25th Anniversary celebration is being planned in June. This event will provide an opportunity for all plants and company friends to get together and celebrate.

It has been a beneficial journey for all. Solar is very thankful for the business relationships established over the last 25 years. Solar's success has been greatly advanced by its vendors, and professional advisors, but is largely due to the dedication of the workforce. Family and friends came along to partner with Bill and Myrt, sharing in their dream of a vacuum heat treating business. Today Solar is looking forward to another 25 years.

Anne Connolly, Marketing Assistant

Its A Beauty!

Excitement for a metallurgist, like his work, can be very specialized. Don Jordan is the head of the Technology Center that advances Solar's metallurgical knowledge for vacuum thermal processing, and he is a metallurgist. When Don walked up a flight of steps to get marketing into the shop with a camera, it was motivated by deep appreciation for the art, as well the science, of heat treating.

The excitement was for a tool steel set-up going into Solar's six foot furnace. It was a beauty to behold! Under the guidance of first Shift Supervisor Dan Wornham, the 2200 lb. load of tool steel for hardening and tempering qualified as a work of art. The many different sized parts, the spacing, and the symmetry of the arrangement brought a sense of awe to those who understand heat treating. The shop floor operators deserve credit for giving Solar's corporate metallurgist inspiration for his day.



Micro Brazing

Solar advertises the capability to vacuum braze parts up to 36 feet long because of our furnace sizes. On the other end of the spectrum is the micro brazing that Solar's braze technicians have accomplished with very small components.

One particular project involved Jamie Jones. Jamie oversees heat treating at the Eastern PA plant, but has had 10 years experience at Solar's vacuum brazing plant. Jamie took on the micro braze project that presented the unique challenges of perpendicular fixturing to join platinum parts.

The learning curve on this braze project was challenging, but success has been achieved. The first issue of the eSpotlight (see page 3), will detail this project.

Customer Service Excellence

Among the top priorities of Solar Atmospheres is excellent customer service. As stated in its mission, Solar will perform, "with an emphasis on quality and responsiveness." The most visible resource for excellent customer service is Solar's furnace capabilities that can "add significant value to our customer's operations."

With over 40 vacuum furnaces, Solar's capacity is a great resource for customers. Varied and numerous sizes allow Solar to meet tight turnaround deadlines on a routine basis with flexibility for customer schedules. Cutting edge furnace technology allows us to be innovative for new applications. Quality equipment makes us reliable. However, after interviewing a number of people who have regular contact with customers, the "X" factor is our personal commitment to communication. This is the core to our customer service.

Mike Drakeley, Director of Sales at Solar Atmospheres, emphasizes that "excellent communication and customer service is not an option, but an integral part of our company's well-being". Drakeley understands that in the heat treating industry, Solar's dedication to personally respond to quality and turnaround questions is a primary reason that customers rate Solar Atmospheres so highly.



Mike Drakeley and Marianne Nace

Marianne Nace, a Solar customer service representative adds, "In my position the essence of customer service is getting back to the customer very quickly. Making sure we maintain good communication on a

daily basis is vital to the customer's perception of our company." Nace is the front-line of our customer service, and provides the feedback and flexibility that our customers' schedules require.

Mike Moffit, a Solar Quality Assurance Technician, believes that "listening is one of the most important aspects of dealing with a customer." He continues, "Listening is one of those skills that is not common enough, and customers really appreciate when you listen to them." Moffit, a man of detail, understands that Solar's customer service qualities are inherent to the company's DNA.

Roger Jones, Corporate President, concurs, "For instance, our sales and our technology department personnel are the problem solvers for our customers." Jones continues, "They give our customers solutions that are critical to the success of their projects, allowing them to be experts in their field without having to learn metallurgy as well. Our Technology Center works and communicates with our customers to determine the thermal specifications needed for new applications." Indeed it is excellent customer service by Solar people that keeps the work on track and orders coming in.

From the receptionist to the CEO, the objective is to tackle and complete the task for the customer's satisfaction. As a former operator, I was able to see first hand the dedication of Solar operators regarding heat treating. Customer service is more than a friendly hello on a telephone or a good handshake; it is each employee's commitment to communicate and bring "significant value to our customers operations", which requires constant and personal communication. This is the core of Solar Atmospheres' customer service.

Tim Williams, Marketing Assistant

"Profit in business comes from repeat customers, customers that boast about your project or service, and that bring friends with them."

W. Edwards Deming

ASM Eisenman Award



Tim Steber, ASM Liberty Bell Chapter Chairperson (also Sales Manager for Solar Atmospheres in Eastern PA) presents the chapter's Eisenman Award to Bob Hill, President of Solar Atmospheres of Western PA.

The Eisenman award is presented each year by the Philadelphia "Liberty Bell Chapter", and is an award in the materials industry for outstanding achievement. Bob was chairperson of the Liberty Bell chapter in 2000, but moved to Western PA to start the Solar Atmospheres' new plant. The award was presented for his outstanding leadership in establishing the new plant and enabling it in eight short years to grow and become one of the largest commercial vacuum heat treating companies in the country.

Bob reviewed the investments that Solar has made, particularly in large vacuum furnaces. The building has expanded from 22,000 to 65,000 square feet. With three 24 foot and one 36 foot vacuum furnace, the largest loads of primary titanium, weldments and machined parts have been successfully vacuum processed. The large producers of titanium such as Timet, RMI and Allegheny Ludlum, as well as large aerospace manufacturers, are regular customers. These furnaces have also been critical to the development and now the production of the new Boeing 787 Dreamliner.

Bob is very appreciative of the work ethic of the Western PA employees, which, he said, is the energy for the company's success.



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UPCOMING TRADE SHOWS



Houstex, February 24-26
George Brown Convention Center
Houston, TX
Booth 1034



Design2part Show, April 21-22,
Valley Forge Convention Center, PA



Westex, March 30-April 2,
Los Angeles Convention Center
Booth 2222



Interwire Trade Exposition
April 27-30
I-X Center, Cleveland, OH