The Brightest Solutions Through Ingenuity

Spring 2012

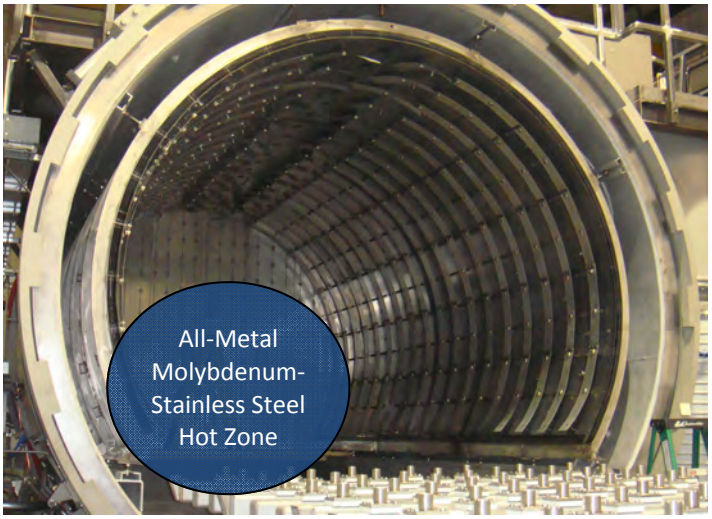
Volume 2 Issue 1

hot zone news

Large Car-Bottom Furnace Being Shipped to China

A large HCB-120180-2IQ furnace is on its way from Solar Manufacturing to Shenyang Aircraft in Shenyang, People's Republic of China. Our newest large furnace will be used for annealing and de-gassing of titanium alloys, as well as processing of other steel alloy parts, for aircraft applications. Representatives of Shenyang visited Solar Manufacturing in mid-February to observe the furnace in operation and complete acceptance testing.

The furnace has a 120-inch heating element diameter and a work zone that is 99 inches wide by 48 inches high by 180 inches deep. It is a single-chamber, internal quench, batch-type, electrically heated high-vacuum furnace. The furnace was designed to meet AMS 2750D, Class 2 Furnace standards for aerospace projects and has "C"-type instrumentation capabilities. Other features include an all-metal hot zone and dual 35" high-performance vacuum systems, controlled by a SolarVac 5000™ PC-based control system with both Chinese and English language interfaces. Unique design features include a specialized, powered loading system, allowing the furnace to have the smallest possible footprint.



HCB-120180-2IQ Furnace Under Construction

Through its Chinese sales representative, Beijing Waves Corporation, Solar Manufacturing will supervise the installation of the furnace and its commissioning as well as customer training in the operation and maintenance of the furnace. Future support will originate from Solar Manufacturing and will be directed through Beijing Waves.

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Attractive Tax Incentive for 2012 Equipment Purchases

Businesses wishing to purchase new equipment to enhance their production potential should be aware of two extended tax advantages for the tax year of 2012.

Qualifying tangible property that would ordinarily be subject to the lengthy depreciation process can be deducted as an expense in the first tax year of use under certain conditions, according to Internal Revenue Code Section 179(a). Items purchased must be used in the company's trade or business, and can be new or used. There is a $139,000 limit on this type of expense deduction, and a threshold of $560,000 on qualifying property purchases, above which the deduction amount is reduced. That means that if a business buys a piece of new or used equipment for use in its trade that costs $139,000 or under, it may be able to expense the whole purchase price in the first tax year the equipment is put into use.

Beyond the Section 179 deduction, a 50% Bonus Depreciation continues to be available for new equipment purchases. Between these two options, there is a distinct advantage to making equipment purchases in 2012. For example, if Company A buys a $500,000 piece of new equipment, it can take $139,000 of that total as a Section 179 expense deduction. On the remaining $361,000 of the purchase price, Company A may take a 50% bonus depreciation of $180,500. Added to the normal first-year depreciation (on a 7-year depreciation class item) of slightly over 14%, or $25,270, Company A may deduct more than 68% of the purchase price of its new machine in the first year, or $344,770.

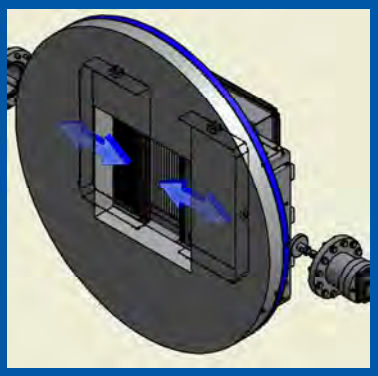
**This information is not intended as tax advice, and any company seeking more information about tax incentives for equipment purchases in 2012 should consult the IRS, or a qualified tax professional.*

Solar Super-Quench 20-Bar Furnace

Advances in engineering and design are continually being sought in order to improve vacuum furnace gas quenching technology. High pressure gas is replacing oil as the preferred method of quenching in heat treating certain alloys in order to minimize distortion and cracking of processed materials, as well as to produce cleaner, dryer parts. Design challenges remain in the quest to advance the art of processing lower alloy materials such as AISI 8620. Solar Manufacturing's SSQ-IQ Series 20-Bar vacuum furnace features the latest such advances including a minimally-restricted gas flow design that greatly speeds cooling rates.

In the SSQ-IQ design, gas flow is expedited through the elimination of the standard fixed exit baffles and the introduction of sliding baffles that open when the cooling gas begins to flow. The gas makes its exit through the open baffles and through the newly designed, high surface area per unit of volume, gas-to-water heat exchanger, returning through an array of tapered graphite nozzles that direct the gas flow to the work load.

Super-Quench 20-Bar Furnace



Sliding Baffle System

The furnace vacuum chamber features a double-walled, water-cooled design with an autoclave-type locking ring on its hinged door that allows high pressure quenching up to 285 psig (20 bar).

These innovatively designed SSQ-IQ furnaces are expected to enhance and speed production in the gear manufacturing industry, as well as for applications that process large loads and heavy cross-sections of materials such as AISI 4140, 4130, 4340 and 52100. These high-temperature, high-vacuum furnaces are available for a variety of workload sizes, and come with fully automated and programmable controls.

For more information, technical specifications or to request a proposal, call (267) 384-5040.

Solar Manufacturing To The Rescue

Heat treaters know that their furnaces are workhorses, comprising a vital step in their work processes. When hot zones wear out or service or replacement parts are needed, Solar Manufacturing's Aftermarket Group stands ready to repair or replace systems on any furnace: not only our own but also competitor models.

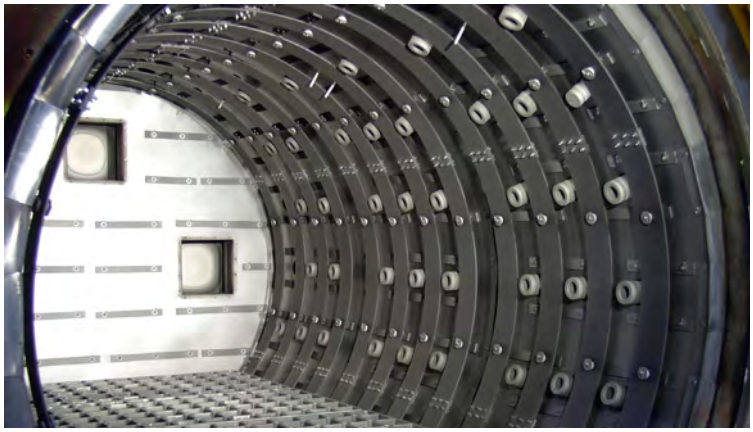
Our experienced staff has extensive knowledge of VFS and Ipsen furnace designs, which constitute a significant number of furnaces in the U.S. New hot zones have recently been installed for several older VFS-type furnaces, giving them a greatly extended working life. Solar's thermally efficient hot zones, allowing for power conservation and its hot zone packages require no cutting, welding, or modifications to the furnace chamber for installation.

The Aftermarket Group is committed to providing quick, individualized service. Many questions are answered and problems solved over the telephone. Field service is also available. In cooperation with our sister company, Solar Atmospheres, we can test equipment designs under actual production condition and enhance our high temperature hot zone technical expertise. This real-world experience gives us a better understanding of your needs and updates that can most benefit you and your equipment.

For expert parts support, telephone support or a hot zone quotation contact Solar Manufacturing's Aftermarket Group through:

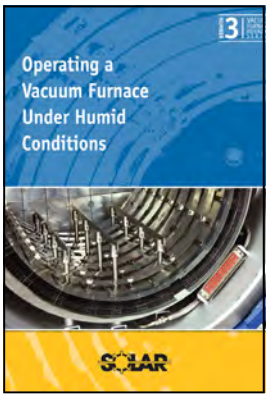
Bryant Strelecki (bryant@solarmfg.com) or

Adam Jones (adam@solarmfg.com) at (267) 384-5040



New Technical Reference Booklets Available

Two new booklets in the Solar Manufacturing Vacuum Furnace Reference Publications series are now available for free download at **www.solarmfg.com**.



Installment Three - "Operating a Vacuum Furnace under Humid Conditions"

Get valuable tips on processing critical work during summer months with high temperatures and high humidity or in rainy winter months. Humid conditions can have a significant adverse impact on the final surface condition and appearance of processed parts. Learn more about the factors relating to humidity and air temperature. Discover proven methods for improving final product appearance and minimizing contamination.

Installment Four - "Understanding PID Temperature Control as Applied to Vacuum Furnace Performance"

Gain a better understanding of control PID parameters and how to control them. Although current instruments have features such as "Autotune" regarding PID, some final "tweaking" is still required to optimize a particular cycle. The booklet fully explains how this can be accomplished.

Additional titles providing answers to common questions and challenges relating to vacuum heat treating include: "Critical Melting Point and Reference Data for Vacuum Heat Treating of Metals and Alloys" — a quick-reference guide for essential data on metals, alloys, and oxides commonly processed in a vacuum and "Optimizing Procedures for Temperature Uniformity Surveying of Vacuum Furnaces" — outlines a recommended procedure for TUS.

Check back in spring 2012 for more new titles. Hard copies are also available by request to info@solarmfg.com

Free downloads at: www.solarmfg.com

New Patent on Innovative Gas Nitriding Furnace

Solar's newly patented vacuum gas nitriding furnace design shortens cycle time up to 50%. The patent's 14 claims (US 8,088,328 B2) revolve around a new design for an all-graphite hot zone, including graphite heating elements, baffles and fan and felt insulation in the vacuum chamber. These advances allow the non-nitriding components of the furnace to function without retort tear-down and scrubbing to restore nitriding constants. Rapid heating and cooling are made possible with a low-mass hot zone, external gas blower and heat exchanger.

Though this new technology was intended for gas nitriding, it has proved versatile enough to be "...equally useful for bright tempering of alloys like H11, H13, D2 and bright annealing of brass alloys," according to Solar Atmospheres' Corporate President, Roger Jones. "This is a significant improvement over standard vacuum furnaces which have slower cycles, or in the case of brass, can cause contamination." Work zone dimensions for the furnace are 30" h x 36" w x 48" d and heating to 1400ºF is standard. Controls are fully automated and programmable and the equipment features a sophisticated gas flow design.

A 50% faster work turnaround, a better, cleaner result and extraordinary versatility make this new furnace a valuable asset to the heat treater. Please contact one of our technical sales representatives at (267) 384-5040 for further information.

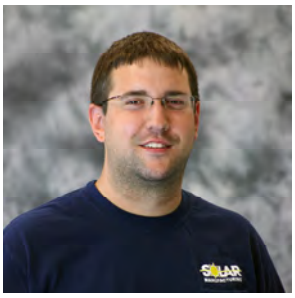
New Control Systems Brochure

Discover the latest in Programmable Logic Controller (PLC) systems for vacuum heat treating in Solar Manufacturing's new brochure. Learn more about the SolarVac 4000™ and SolarVac 5000™ PLC-based control systems with their advanced Allen-Bradley SLC 5/05 PLCs and user-friendly qualities, including color touchscreen monitors.

The new brochure gives an overview of the control systems' characteristics, including descriptions of the standard display screens for each. Visual images of each of the main display screens are shown, including screens for the many storable run profile recipes, as well as trouble-shooting, maintenance, and TC status screens. The descriptions highlight the user-friendly aspects of SolarVac 4000™ and 5000™, which show the furnace operator process status details at a glance, allow editing of one cycle recipe while another is running, monitor safety features, and minimize the possibility of operator error.

Details about the components of each system are given in the brochure as well. A copy of the brochure or further information is also available from the sales staff of Solar Manufacturing, at (267) 384-5040.

New Employees and Promotions



Kyle Jacoby

Kyle Jacoby has been promoted from Electrical Technician to Group Leader of the Electrical Group, providing direct supervision and leadership, and assisting in all phases of the electrical construction of vacuum furnaces.

George Gradwell

Brought to Solar in December of 2011, George Gradwell works as a mechanical designer, primarily focused on hot zone design and detailing. George holds credentials with the American Institute of Drafting and the Engineers Club of Philadelphia. He comes to us with work experience designing test chambers, calorimeters, and valve and pump systems.

Other New Employees

Jason Davidson is a new employee working in a Refractory Mechanic capacity under the leadership of Jim Strelecki, Refractory Group Leader.

Steve Frantz and Tim Kuczkowski have also begun their duties, as Assembly Mechanics, working with Group Leader Tim Rohl.

Solar PLC Controls in Use

Two Companies = One Solar Team

Solar Manufacturing's mission is to assist our customers by building the highest-performing, most cost-effective, energy-efficient and technically-advanced furnaces, control systems and power supplies on the market. Solar's support continues with outstanding aftermarket services, such as repairing and replacing hot zones and providing spare parts and service.

Laura Edwards

The company's ability to achieve these goals is enhanced by harnessing the heat-treating expertise and experience of its sister company, Solar Atmospheres. As of January 2012, Laura Edwards of Solar Atmospheres was appointed Corporate Marketing Manager to coordinate informational outreach between the two companies.

Part of her new role is to share the lessons learned in the world of production heat treating with the world of equipment manufacture and repair. You can imagine the valuable feedback and insight that can be gained from running over 55 vacuum furnaces 24/7!

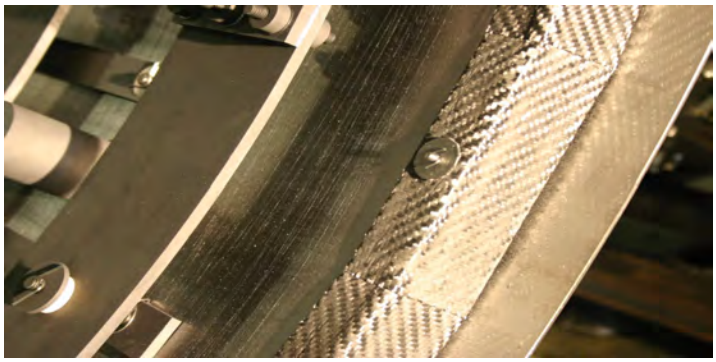
An integrated knowledge base developed by Solar's engineers and scientists allows it to continuously take the performance of **every** department at Solar Manufacturing to the next level: research and development, manufacturing, and repair and replacement. In turn, customers benefit from furnace designs born from "proven engineering" and the technological innovation that can only come from knowing the heat treating business "inside and out."

Advances in Research & Development

Solar Manufacturing, in co-operation with Solar Atmospheres, continues to improve furnace design through its Research and Development Group. During the past year, research has been heavily concentrated on reducing power requirements by building more efficient hot zones. Electrical power required to maintain high temperatures for a workload is directly related to power losses through the furnace insulation. Minimizing these losses has become our goal.

We are beta testing some new designs, that with certain configurations, are expected to reduce power losses through the hot zone insulation up to 40-70%. Over years of operation, this adds up to a significant power savings, especially with cycles requiring long holding times at elevated temperatures.

Solar's test program should be completed in the next three months. Conclusions and findings will be announced to the industry. In the interim, vacuum furnace users needing a rebuild of one of their hot zones can take advantage of these new designs by contacting Solar Manufacturing's Aftermarket Group.



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Newsletter for Solar Manufacturing **Volume Two, Issue One** **Spring, 2012**

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