

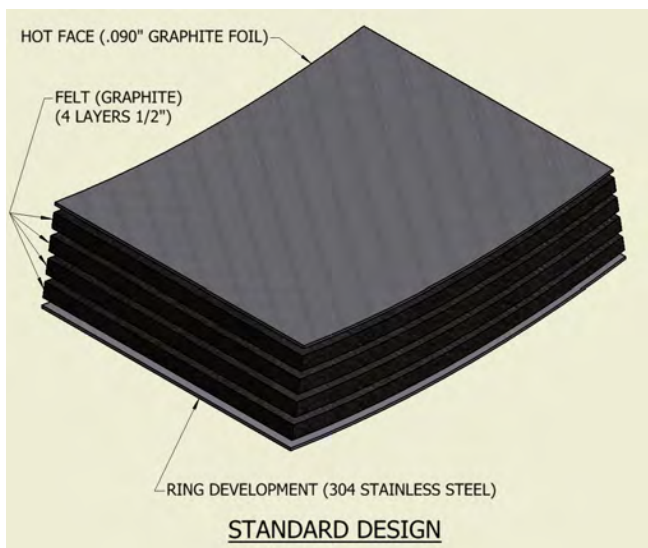
High Efficiency GraFFite™ Hot Zone Development

The heat treating industry produces a very limited number of advanced developments when compared to other industries such as the electronics field. However the Research and Development department of Solar Manufacturing's sister company, Solar Atmospheres, recently achieved an important new advancement in hot zone design.

Furnace thermal losses have always been a concern of vacuum furnace engineers and efforts on minimizing these losses have been slow in emerging. Recent ther-



Solar's Advanced Insulation Design



mal loss calculations backed by carefully selected laboratory vacuum furnace testing led Solar to develop a new hot zone concept, called GraFFite.™ It is projected to significantly reduce hot zone power losses within the same insulation dimensions and without compromising vacuum performance. This design of graphite foil layers interspersed between graphite felt layers is licensed and protected within the vacuum furnace industry under U.S. Patent No. 7,760,992.

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AND MORE . . .

New Vacuum Furnace Purchase Guide Available

A new vacuum furnace is a significant investment for any heat treater. The furnace should be a productive and reliable piece of equipment for many years. Seeking the best information available before making a purchase will help ensure a wise choice and a satisfied buyer. "Important Considerations When Purchasing a Vacuum Furnace," published by Solar Manufacturing, is a detailed guide for furnace buyers, and is Number 6 in our Reference Booklet Series.

Readers will receive clear and unbiased information on all aspects of furnace design and construction, and how to get the most value for each dollar spent.

Price is an obvious consideration for every buyer, but other factors are important as well. Many design feature decisions affect the performance and value of the

finished vacuum furnace. The guide gives buyers tools to make informed choices regarding each feature.

Sections of the guide include:

- Work volume options
- Weight capacity options
- Maximum working temperature
- Temperature uniformity qualities
- Best hot zone construction
- Desirable vacuum performance
- Recommendations for pumps
- Furnace chamber and door choices
- Optimal gas cooling systems selection
- Dry vs. water-cooled power supply
- Best controls options
- Best instrumentation options



To obtain a copy of the booklet, contact Solar Manufacturing at (267) 384-5040, or visit www.solarmfg.com.

Superior Hot Zone Rebuilding

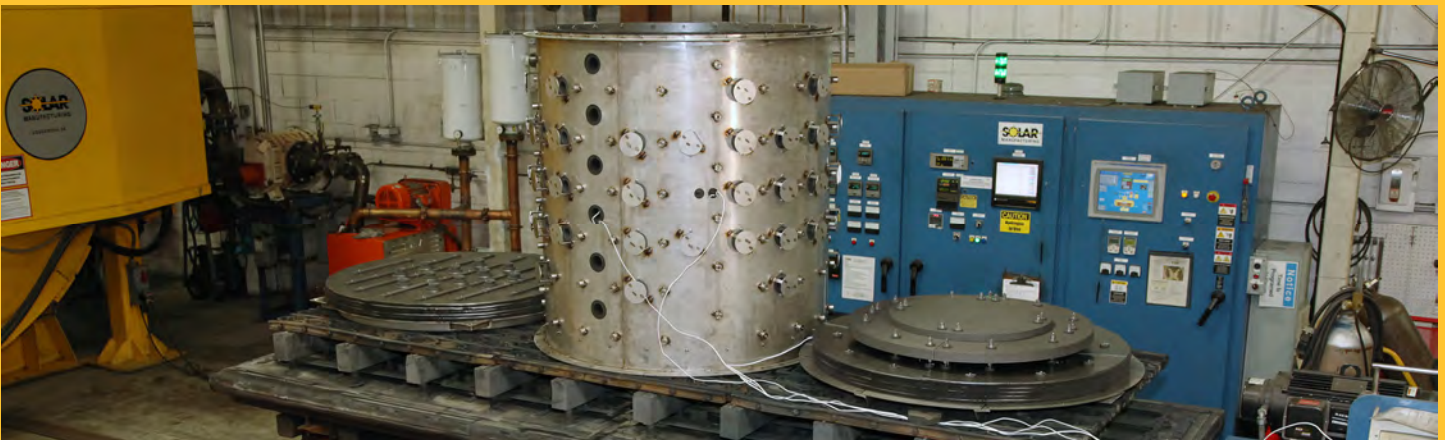
Solar Manufacturing offers extra value in rebuilding existing hot zones. Not only do we meet or exceed customer requirements completely, but we can also add beneficial steps not normally provided by our competitors.

One example of our extra effort was the high temperature bakeout of a recent hot zone rebuild prior to shipment. Through our sister company, Solar Atmospheres, we were able to bake out the entire hot zone to remove any residual contaminants that might eventually show up after final furnace installation.

The photo below shows this recent rebuild being processed in one of our car bottom furnaces, providing a final product that will give excellent performance with respect to both vacuum and temperature.

Solar Manufacturing can put this type of value-added step into any requested hot zone rebuild, and will work to demonstrate why our rebuilds exceed the norm.

Contact one of our hot zone specialists, either Bryant Strelecki at bryant@solarmfg.com or Denny Hiddemen at drh@solarmfg.com.



New Vacuum Heat Treatment Book Published



Vacuum Heat Treatment: Principles, Practices, Applications is a new book written by Daniel H. Herring, with a foreword by William R. Jones, CEO of Solar Manufacturing. It is the first truly comprehensive resource on the subject of vacuum technology, the fastest growing segment of the heat treat industry today. This valuable reference book provides the reader with practical advice, a diverse set of application examples, and a wide range of technical and engineering information necessary for making informed decisions about heat treating and the equipment necessary to do the job.

What makes this book unique is that it is written in such a way that engineers, metallurgists, heat treating operators, supervisors, managers, quality, industrial and manufacturing engineers and just about anyone interested in thermal processing or manufacturing can become skilled in the art and science of vacuum heat treatment.

Vacuum Heat Treatment is scheduled for publication in September 2012 and it will be available at www.bnpmmedia.com. Or see us at Booth 214-216 at the FNA 2012 show in Nashville, TN October 2-3, where we will have a drawing to give away copies of this valuable book. The author, Dan Herring, will also be on hand to sign book copies during the show.

Stack Metallurgical Opts for New Solar Manufacturing Furnace

Solar Manufacturing Inc. is pleased to announce that Stack Metallurgical Services of Portland, Oregon, has purchased a Model HFL-5748-2EQ Vacuum Heat Treating Furnace. Although Stack has used other brands of furnaces in the past, a cooperative design effort from Solar Atmospheres and Solar Manufacturing on specific technical and processing needs has convinced this customer that a Solar vacuum furnace purchase will best satisfy their current and future requirements.

Stack's purchase, a new Model HFL-5748-2EQ, has a work zone measuring 36" Wide x 36" High x 48" Deep with an operating temperature up to 2500°F and a workload capacity of 5000 pounds. The hot zone insulation package will be an efficient graphite foil hot face backed by four layers of ½" graphite felt, all housed in a 304 stainless steel support ring. A large mechanical pump, booster pump, and diffusion pump system is included for vacuum operation in the 10⁻⁵ Torr range. For minimal power consumption, the diffusion pump heaters are monitored and controlled by a Solar ConserVac™ system, a microprocessor-controlled arrangement that adjusts the electric power input of the vacuum diffusion pump. The external gas cooling system incorporates a 150 HP motor and supporting heat exchanger for rapid cooling of the workload at 2 bar gas pressure, and multiple fixed, tapered graphite gas nozzles surrounding the workload. Furnace control and operation is accomplished via a SolarVac 5000™ Computerized Instrument Package incorporating a user-friendly touch screen panel and Wonderware software for ease of operation.

William R. Jones, CEO of the Solar Companies, states "We have worked with Stack for a number of years to help with technical issues regarding various vacuum furnaces and we are pleased to supply a new Solar vacuum furnace to meet Stack's specific requirements today."



New Model HFL-5748-2EQ

Replacement Hot Zone Receives Customer Praise

Solar Manufacturing's Aftermarket Service group has received excellent news regarding one of our recently installed replacement hot zones. Following installation and preliminary testing, the furnace was put through a temperature uniformity survey (TUS) to assure excellent uniformity throughout the entire hot zone. This customer reported the following:

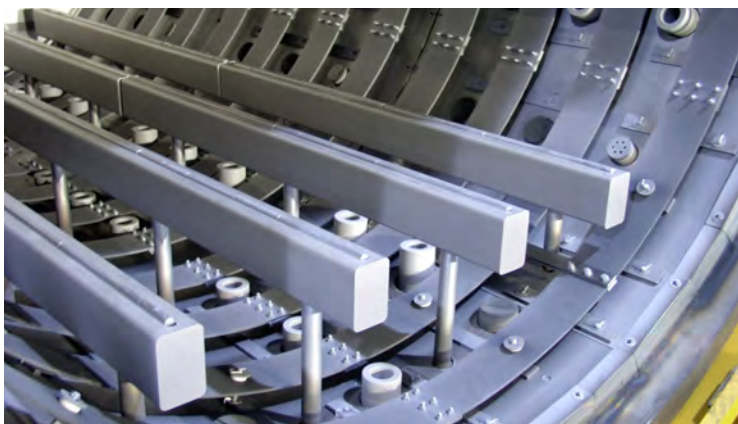
"The hot zone performed very well. Our instrumentation techs say that the survey performed on the hot zone was the tightest temperature spread they have ever seen".

In fact, the temperature uniformity was within $\pm 5^{\circ}\text{F}$ on this furnace, inspiring the customer to place an order for an additional hot zone.

The Solar Manufacturing Aftermarket group has the advantage of extensive experience not only regarding Solar's own furnaces, but also in providing rebuilds on several competitive brands of furnaces. Through cooperation with our sister company, Solar Atmospheres, we have access to all types of hot zone designs (more than 50 furnaces in operation) where we have gained valuable knowledge to offer to future customers. This real-world experience gives us a better understanding of end-users' needs and allows us to provide the best solution for the application.

Solar Manufacturing's Aftermarket Group is available to provide expert support in both hot zone rebuilds and spare parts requirements. Contact:

Bryant Strelecki at bryant@solarmfg.com or
Adam Jones at adam@solarmfg.com.



Versatile Heat Treating and Brazing Furnace Available for Quick Delivery

For applications requiring a high-performance, energy-efficient, easy-to-maintain furnace, Solar Manufacturing's Model HFL-5748-2IQ is your ideal choice. Featuring a horizontal, front-loading design, this furnace offers easy, convenient loading and unloading of workloads and fixtures through its hinged front door. Door seal problems are eliminated by its autoclave-style locking ring closure.

With a hot zone measuring 36"W x 36"H x 48"D, a 3500 pound workload can be processed. Uniform radiant heat-up for high temperature applications up to 2500°F is achieved by thin, curved graphite heating elements. The hot zone is insulated by graphite for high energy efficiency and minimal heat loss.

High-performance internal gas quenching offers rapid cooling at positive pressures up to 15 psig (2-bar). Fully automated, programmable controls are provided by the user-friendly PC-based SolarVac 5000™ industrial controls package. A combination Stokes/Varian pumping system gives reliable vacuum performance year after year. It's a hard-to-beat combination: spacious work area, excellent heating and insulation, reliable vacuum pumping, and user-friendly controls.

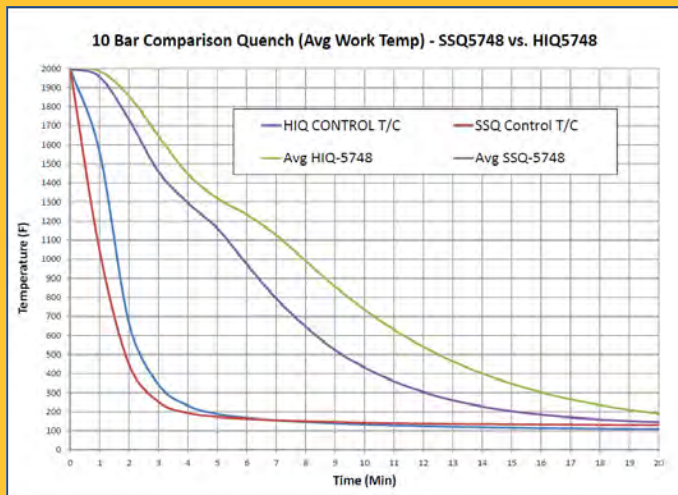
This furnace is designed for ease of use and maintenance and minimal downtime, and carries a one-year warranty. It is fully constructed and ready to ship.

For further information, contact the sales staff of

SOLAR
MANUFACTURING
(267) 384-5040

New 20 Bar Furnace Exceeds Expectations

Recent testing regarding our new 20 bar vacuum furnace resulted in at least a 30% improvement when compared with existing equipment when tested at 10 bar using the same load and gas cooling pressure. Further extended testing will be completed following final furnace installation at our Western Pennsylvania facility.



The figure above highlights the average of the load thermocouple for each furnace. In addition to the cooling improvement, testing also indicated that gas flow velocities through the nozzles were very consistent throughout the hot zone.

Summarizing specific features and advantages of our 20 bar furnace:

- Sliding rear baffles minimize radiation losses and provide direct gas flow to the heat exchanger, an improvement over standard fixed exit baffles, which restrict flow.



- A chevron-type diffuser before the heat exchanger minimizes radiation loss during cooling and provides excellent distribution to the heat exchanger.
- The highly efficient and more compact heat exchanger incorporates higher surface area per unit volume.
- This design provides maximum available horsepower by reducing pressure drops through the entire system, allowing for maximum acceleration of cooling gas through the tapered nozzles.
- The no-plenum design allows for better and more uniform gas flow and distribution throughout the entire hot zone.
- It features optimum utilization of 300hp motor output with the introduction of a VFD (variable frequency drive) and the ability to cool at various backfill pressures while varying motor speed to achieve constant maximum horsepower.

Efficient Hot Zone

Continued from Page 1

Although with this concept, initial hot zone costs are slightly higher, prompt payback with reduced energy costs is expected. To prove this design in daily performance, Solar has released a purchase order to build a mid-size production vacuum furnace hot zone incorporating this new concept. Very careful power measurements will be obtained with our Fluke Power Analyzer and with fixed hot zone thermocouples placed within the new hot zone at soaking temperatures of 1600°F, 1800°F, 2000°F, 2200°F, 2400°F, 2600 F, and 2800°F.

Additional information and results will soon be released.

Come and see us at
Booth 214-216
FNA 2012 • Nashville • Oct 2-3

where our new high-efficiency
GraFFite™ Hot Zone will be
on display



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Newsletter for Solar Manufacturing, Inc.

Volume Two, Issue Two

Fall, 2012



When "just good enough"
isn't good enough for you.



INGENUITY

Go beyond a "make do" furnace with creative design from Solar Manufacturing. Whether your vacuum processing challenge is ordinary or extraordinary, our innovative engineering opens a new world of possibilities. Unbounded thinking paired with deep experience creates unique solutions to efficiently meet your needs.

Learn how our game-changing insight can take your heat treating business to the next level, call 267.384.5040 or visit www.solarmfg.com.



*The Brightest Solutions
Through Ingenuity*

 PROUDLY MADE IN THE USA

*New 20 bar high-pressure
quench vacuum furnace
Model HFL 5748-20IQ*



Experience



Value



Service



Versatility



Integrity