

The Afterglow of Furnaces North America 2022

Takeaways from the heat-treating industry's premier event

Aaron Fagan, Senior Editor



PHOTO CREDIT: NITREX

Furnaces North America 2022 (FNA 2022), presented by the Metal Treating Institute (MTI), in partnership with its media partner, Heat Treat Today, is the heat-treating industry's go-to event every other year. FNA 2022 attracted attendees from across North America, including Fortune 500 companies. For three days attendees took part in networking, connections, and learning about the vast changes taking place in emerging technologies, industry trends, and advances in equipment.

Gear Technology spoke with Rick Clift—quality assurance manager for H&S Heat Treat located in Ontario, Canada, and an MTI board member—and he emphasized the value of the FNA show for connecting the gear industry with experts in the heat-treating industry and keeping up with technology: “I meet people who struggle and struggle to meet spec. The gear manufacturer getting some knowledge, exposure, and understanding from the heat-treat industry is critical. FNA is a perfect opportunity. All the commercial heat-treaters in North America will be there, and they have a wealth of experience.”

Stabilizing dimensional movement from the carburizing process is especially crucial to the gear industry, and Clift says, “Some of the emerging technologies in heat treat to look out for are in vacuum carburizing and controlled-gas carburizing. They have been used very effectively to control product and process quality to minimize movement.” Clift added, “The great thing about FNA for gear manufacturers

is they will be able to speak with the people who build and use the furnaces that heat treat the gears they make.”

A special thanks to Tom Morrison, CEO of MTI; Rick Clift, quality assurance manager, H&S Heat Treat; and Bob Ferry, vice president of engineering and quality, FPM Heat Treating for their help in assembling this piece.

Nitrex

Nitrex showcased its strength in thermal processing from turn-key heat-treating systems to process control solutions, software/digitalization, and heat-treating services at FNA 2022.

Nitrex revolutionized controlled gas nitriding with NITREG over 40 years ago, and they continue to be at the forefront of this surface hardening technology today. Nitriding and its derivative processes, such as ferritic nitro-carburizing, as well as other special processes for nitriding stainless steels, are the most rapidly expanding processes for the surface hardening of gears.

Nitrex works with gear manufacturers from all over the world, assisting with prototyping to process development, low- to high-volume heat treat orders, and new in-house, high-volume installations as well as retrofit applications. These end-to-end solutions deliver superior quality by improving the durability and performance of gears as well as the efficiency and simplicity of gear manufacturing operations.

When it comes to improved gear performance, Nitrex's controlled NITREG controlled nitriding, NITREG-C controlled nitrocarburizing, and NITREG-S controlled nitriding

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of stainless steels with its inherent low-temperature processing, are highly beneficial to the automotive, aerospace, defense, mining, and many other industries. Here are some key benefits:

- Optimum and consistent gear properties
- Improvement of gear tribological properties
- Best alternative to eliminate gear distortion (noise reduction)
- Cost-effectiveness by eliminating or reducing several finishing operations, including washing, inspection, hard finish machining, etc.
- Similar bending stress limits and contact fatigue resistance to carburizing
- Environmentally friendly

During the FNA exhibition, Nitrex officially debuted QMULUS, an AI and machine-learning platform designed to digitize the heat treat shop floor for real-time visibility and management of heat-treating operations. Visitors were able to watch a live demonstration of QMULUS and learn how big data and digitalization can help achieve predictive quality and benefit the bottom line.

In addition to its turnkey nitriding systems and technologies, Nitrex showcased its vacuum furnace lines for aerospace and additive manufacturing applications, as well as the UPC-Marathon line of oxygen probes, process control solutions, flow solutions, and endothermic gas production systems, which are enabling customers to extend asset service life while meeting the latest quality and safety standards and supporting sustainability efforts.

“Gear manufacturers recognize that Nitrex’s diversified solutions make good business sense for today’s gear production,” said Mark Hemsath, vice president sales, furnaces and heat-treating services. “Low distortion surface hardening means virtually no hard machining after heat treatment. We improve the quality and longevity of gears, extend the life of furnaces, and are able to process a large volume of gears correctly and on time. With installations across North America, the Nitrex team was excited to demonstrate the capabilities of our systems, equipment, and services at Furnaces North America.”

nitrex.com

AFC-Holcroft

AFC-Holcroft was proud to once again exhibit at FNA. This specialized industry event is considered the opportunity for manufacturers—across diverse industries who utilize heat treatment in their production—to learn more about solutions that may be relevant to their unique metallurgical challenges.

Although AFC-Holcroft offers several thermal technologies suitable for the production of gears, one product worthy of a special attention is the UBQA (Universal Batch Quench Austemper) furnace.

While best known for austempering of steel, the UBQA is capable of a number of metallurgical processes including neutral hardening, carburizing, carbo austempering, marquenching, and austempered ductile iron (ADI).

Austempering is unique in its ability to control distortion and the associated costs of machining. AFC-Holcroft’s



PHOTO CREDIT: AFC-HOLCROFT UBQA

exclusive water injection system can provide quench severities similar to a water quench and can through harden up to 6-inch (152mm) thick cross sections. The UBQA uses molten salt as a quench medium, which when outfitted with a salt reclamation system allows for over 98 percent recovery of the salt. And the residual waste can typically be disposed of in municipal drains without the need for special permits or methods. The industrial manufacturer seeking a greener alternative would be well served to give this proven design some serious consideration and to inquire about possible cost savings in disposal and salt investment.

In addition, the UBQA design is not limited to gas heating—it is also available as electrically heated, allowing the customer to utilize green-energy options that may be available in their area, such as solar, hydroelectric, and wind.

The UBQA is modular in design, which allows for flexibility in the layout of the furnace itself and its companion equipment. A flexible production cell can be far more accommodating for fluctuations in production volumes, and easier expansion capability for future installations. Several standard size furnaces are offered, and customization is available to meet specific customer requirements.

But the UBQA is not AFC-Holcroft's only product that gear manufacturers may find of interest. Consistently high production volumes may make consideration of a single or multi-row pusher furnace a more cost-effective option in some facilities. Or an AFC-Holcroft rotary hearth furnace for preheating and press quench may be more suitable. There

is no one-size fits all option—and that's where their furnace experts can help.

afc-holcroft.com

Rubig



PHOTO CREDIT: ZF Windpower

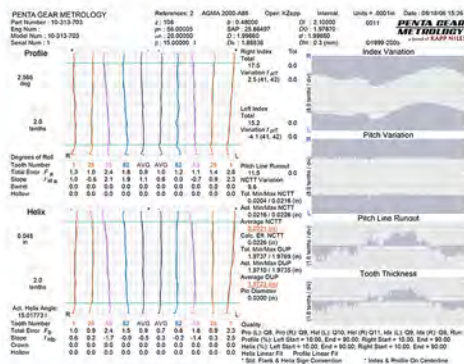
At the top of heat treatment is nitriding large gearbox components such as those used for wind power generation which can present major challenges including situations where wear resistance is specified alongside the parameter that only certain areas may be nitrided.

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Although gas nitriding is also used for certain special applications, PLASNIT plasma nitriding is the preferred process because of the main advantages:

- Mechanical covering is possible and thus eliminates time-consuming masking with pastes, which contaminates the furnace
- No ammonia is used, which makes it environmentally friendly
- The omission of ammonia also means that there are no open flames inside manufacturing sites, there are no poisonous gases in use, and no costly safety measures are required

With component diameters of up to three meters (the size of the treated parts is a big issue for both manufacturers as well as commercial heat treaters), Rubig also offers tailor-made furnaces, which can treat very large components.

rubig.com/en/heat-treatment/rubig-heat-treatment

Gasbarre Thermal Processing Systems

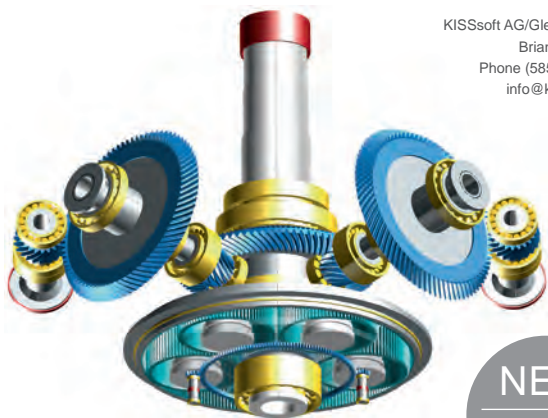
Gasbarre Thermal Processing Systems' continuous vacuum furnaces utilize the latest in controls technology and offer repeatability and modular flexibility to meet the needs of virtually any vacuum heat-treating process. With temperature capabilities up to 2,650°F, they are designed to meet AMS 2750G requirements with uniformity up to Class 2 ($\pm 10^\circ\text{F}$) and instrumentation configuration Types D and E. They can be equipped with oil or gas quenching modules with gas pressure capabilities up to 10 bar, making them ideal for hardening applications. Modular equipment design allows low-pressure carburizing dwell times and index rates to be fine-tuned to meet process and production requirements, optimizing the return on value for your investment.

In addition to their robust design and modular flexibility, Gasbarre's continuous vacuum furnaces offer several unique advantages over other types of vacuum heat treat equipment. Concurrent processing reduces the effective duration of the heat-treating cycle by eliminating work staging and vacuum pumping from floor-to-floor time. The resulting higher throughput allows for smaller load sizes which help overcome challenges with uniformity and repeatability associated with larger workloads required to achieve production rates in batch equipment.

Because heating and cooling are performed in dedicated sections of the furnace, thermal efficiency is dramatically improved over batch-style furnaces where the entire insulation assembly must be heated and cooled every cycle. Similarly, dedicated sections of the furnace reduce process gas requirements for cooling and partial pressure. In addition to reduced utility consumption, the lack of thermal cycling and oxygen exposure dramatically improves the life of refractory consumables within the furnace, reducing maintenance costs and downtime.

Continuous vacuum isn't right for every gear treating process which is why Gasbarre Thermal Processing Systems designs, manufactures and services a full line of thermal processing equipment for virtually any process. Gasbarre's offering includes continuous and batch atmosphere and vacuum equipment; serving customers in the automotive,

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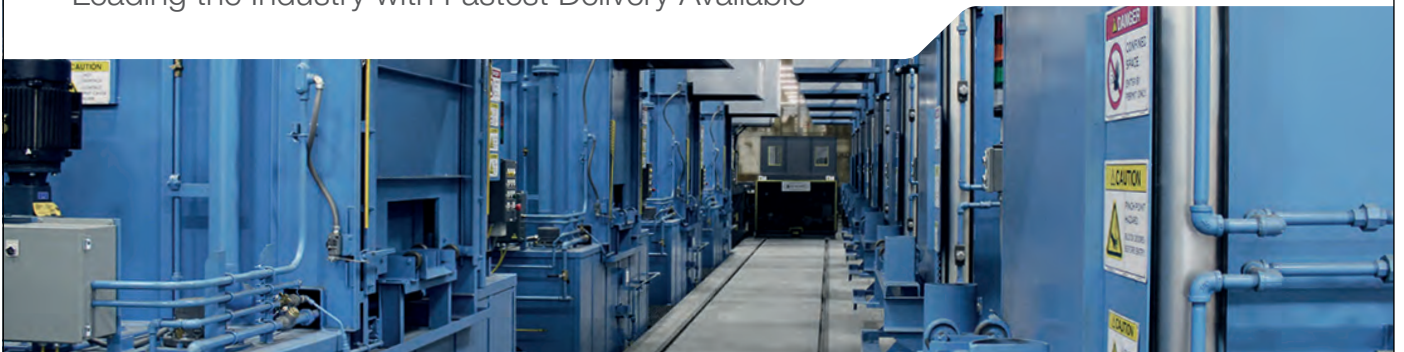


PHOTO: Gasbarre Continuous Vacuum Oil Quench

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