

The background of the advertisement is a photograph of an industrial facility. On the left, a large cylindrical heat treatment chamber is visible. In the center-right, a more complex piece of machinery with multiple horizontal rollers or racks is shown. The floor is concrete, and various pipes and structural elements of the factory are visible in the background.

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INTRODUCTION

Mainstream media reports tell us the world as we know it is coming to an end and most unfortunately taking manufacturing and consequently heat treating with it. However when I scan through the September 2020 issue of “**The Monty**” that’s not the message I am seeing. What I see are reports of the firearms industry not being able to keep up with demand. I see Nitrex, Poland expanding, Hauck in The Netherlands adding capacity, I see Ipsen landing vacuum furnace orders, furnace builder Gasbarre delivering an impressive vacuum system, Surface Combustion, Can-Eng, AFC-Holcroft and McLaughlin Furnace Group also have announcements about new orders. Not for a second would we suggest that things are good these days but on the other side of the coin we have yet to see a single company in our industry go out of business. The message is that while these are tough times we are reasonably certain that no matter what happens the heat treatment industry will survive.

Sincerely,



Gord Montgomery



Jordan Montgomery



Dale Montgomery

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HEAT TREAT NEWS

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Surplus Vacuum Carburizing lines and more Heat Treatment News

Aug 31, 2020



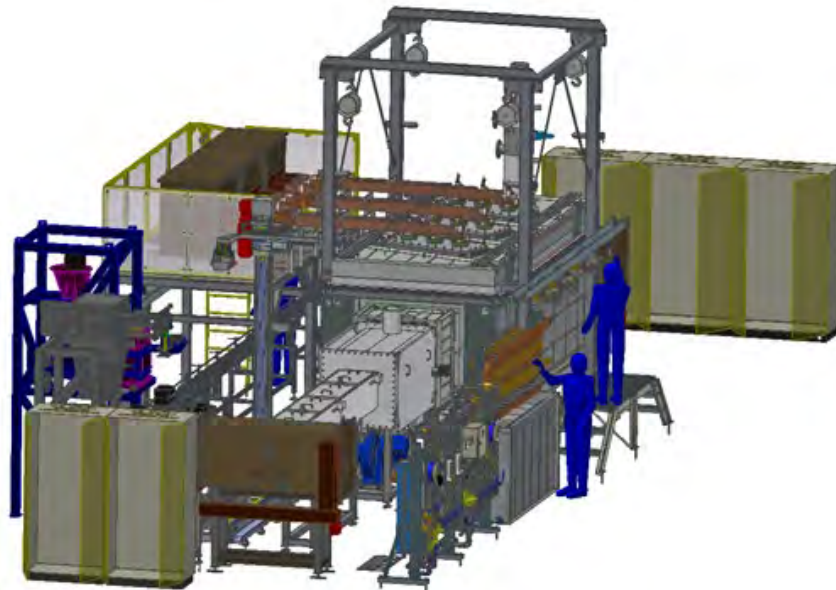
This week we are going to start off with news about new furnace installations/orders starting off with a **Can Eng** mesh belt order. *"Can-Eng Furnaces International Ltd. designed, built and delivered a mesh-belt heat-treatment furnace line to Gallos Metal Solutions of Milwaukee, Wis. The continuous atmosphere system will be used primarily for demanding processing, including carbonitriding and carburizing, while allowing for neutral heat treatment with a production capacity up to 4,000 pounds/hour. This*



high-capacity furnace line is part of Gallos' expansion and modernization project, which has more than doubled the existing plant square footage, increased capacity and added automation." Back in 2009 Service Continuous (part of Service Heat Treating in Milwaukee) was acquired by Gallos Metal Solutions Inc, a company owned by James Gallos. James had been Vice President/General

Manager of Service Continuous for a number of years. From **McLaughlin Furnace Group** we have this press release; *"McLaughlin Furnace Group of Avilla, Indiana, USA is pleased to announce the successful installation and start up of a 9,000 CFH Endothermic Generator at Volvo Powertrain in Hagerstown, MD, USA. The two retort Tru-Mix unit is supplying a McLaughlin pusher furnace and has a turn down ratio of 8:1."*

Cremer is a German furnace builder whose equipment is generally only found in companies doing sintering of PM Parts. We have run across their furnaces at auto parts supplier Stackpole in North America but that is pretty well the only time we have seen their equipment. This press release tells us they have developed a 2500C furnace; ***“CREMER Thermoprozessanlagen GmbH, Düren, Germany, has completed its EU-funded CARBIDE2500 project. The project launched in May 2018 and is reported to have met its objectives, developing the first 2500°C industrial furnace, enabling higher efficiency and the production of tungsten carbide with up to five times higher material strength than otherwise possible. CREMER specialises in pusher furnace systems with graphite coatings which operate at extremely high temperatures, above 2000°C. These systems are used in the carburising process for carbide powders such as tungsten carbide (WC). According to the company, at the time of the project’s launch in 2018, the economic downturn and subsequent recovery in Europe had resulted in increasing demand for higher strength materials.”***



We next look at a company in the UK adding vacuum furnace capacity. **Chromalloy**, a global company which services gas turbine engines is adding capacity to their Alfreton, UK facility. As you can see below the company just received a “Titan” vacuum furnace from Ipsen and are hoping to have it up and running in the very near future.



There are a number of companies in the US that are finding business to be good enough to warrant adding heat treat capacity or invest in an in house heat treating department. These include *Jagemann Munitions*

Components out in Wisconsin, *Prescription Manufacturing* LLC in Iowa and *Holte Manufacturing* in Oregon. It's very encouraging to see as much investment in the industry as there actually is.

We don't run across used *Vacuum Carburizing* systems that often but for some reason we are aware of two on the used market. The first (pictured below) is located at a piston manufacturer in the Midwest. It has been on the market for a number of months and it is being sold because the vendor is going the route of a different heat treating technology-Plasma Nitriding of all things. The second very impressive *ECM* system will be hitting the market any day now and looks to be a multi chamber system.



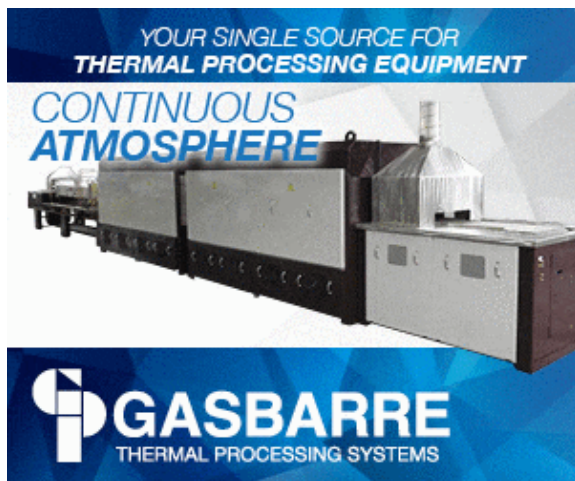
And to round things out we have this press release from chemical distributor **Hubbard-Hall** whose banner ad can be found on the right hand side of this page; *“Hubbard-Hall Inc., is pleased to announce the promotion of Ted Saltzman to Business Development Manager and the hiring of Andre Depew, as Product Manager of Metal Coloring. These strategic appointments will support the company’s growth in its lines of specialty chemicals for surface finishing and the ability to offer process expertise to its manufacturing customers.*

In the newly created role of Business Development Manager, Saltzman will be responsible for managing corporate accounts and selling a full range of products in the U.S. and Mexico. Saltzman joined Hubbard-Hall in 2017 as a Territory Sales Manager where he provided consultative sales presentations in the Texas area.

The newest addition of Depew comes when Hubbard-Hall is expanding its sales and applications expertise in the metal coloring line. Depew is responsible for expanding the business plan for the metal coloring product line, including Black Magic® (offering the darkest and fastest black coating) and Mi-Tique® (antiquing). Depew will also support customers in phosphate conversion coatings and heat treatment.

With Hubbard-Hall as the only major supplier to offer hot black oxide and room temperature black oxide, Depew’s 30 years of expertise in metal finishing, machining, and heat treating will be of value. Depew’s prior positions have developed his skill set to work with customers in a consultative manner, providing them with the best products for their process. Depew has serviced customers throughout the Midwest and Southeast”.





Advantages of CFC Fixtures When Case Hardening In Automotive Application

Aug 28, 2020

The drive component cited in this article is case hardened in a multi purpose chamber furnace. The surface/weight ratio is low and characterized by a solid cross-section in different sizes. Component distortions due to heat treatment are thus less critical and are not considered further. The largest component weighs about 500 g. Components are loaded in cast baskets, which are positioned on cast base trays (Fig. 1).



Fig. 1: Production batch stacked in cast baskets and cast base trays

The existing production capacity is to be made available in full for the current order volume without additional plant investments and customer delivery dates are to be met. Production will take place in three-shift operation 7 days per week. A furnace campaign takes about 10 h and is limited by the weight of the maximum load capacity of the system of 1,500 kg. The cast loading systems used cannot increase the furnace capacity in pieces/batch. Based on experience gained internally with CFC (CFC = Carbon Fibre – reinforced – Carbon), a corresponding CFC fixture system is preferred. Compared with a cast fixture, the mass of the CFC fixture can be reduced significantly and this enables a larger number of components per batch (packing density); furnace loading with a maximum total mass of 1,500 kg (fixture and components) remains the decisive criterion.

CFC ASSESSMENT

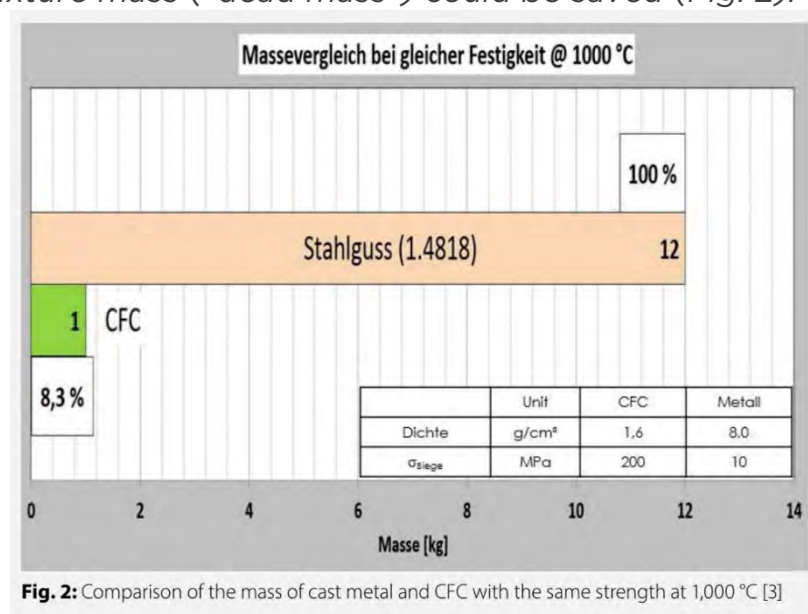
Specific examples were used in [1] to demonstrate the advantageous properties of CFC workpiece fixtures for drive components with low-pressure carburizing and subsequent gas quenching. For the application described in this article, the following advantages support the use of a CFC system [2]:

- Higher loading (components/batch) thanks to slim design (spec. strength [strength/bulk density])

- Employee-friendly loading and unloading

- Long service life of the fixture (no distortion of the fixture due to creeping/embrittlement).

The assessment of specific strength in terms of the “load bearing capacity” of CFC and cast steel shows that, theoretically (component dependent), about 90 % of the fixture mass (“dead mass”) could be saved (Fig. 2).



Due to the lower density (CFC: 1.6 g/cm³ / cast steel: 8.0 g/cm³), the energy requirement of a CFC fixture when heated from room temperature to 1,000 °C is calculated to be about 1/5 of the comparable requirement of a cast fixture [2]. The combination of load bearing capacity and energy requirement in the CFC fixture promises a higher packing density and thus a higher furnace capacity. Compared to low-pressure carburizing with high-pressure gas quenching (N₂, He), which takes place without oxygen, in the case of gas carburizing and subsequent oil quenching, the chemical degradation of CFC by oxidation is to be assessed. Above 350 °C, the CFC surface can be damaged by oxidation in air, so lowering the load bearing capacity. Based on HEAT's own operating experience and extensive preliminary tests, a reasonable plant modification is needed at the exit of the batch. This ensures that the CFC is not exposed to any critical temperatures above 350 °C. Most oil residues are removed in the subsequent washing process. The solvent used does not affect the material. These results were a factor in the decision to use a CFC system.

PROCESS ANALYSIS AND CFC REQUIREMENTS

The process analysis defines the technical requirements of the CFC fixture. As a lift truck (forklift truck), connecting rods and transport chains are used for transportation, a cast base tray was selected as link (transport systems – casting – CFC). With the cast CFC material combination, the clearly different thermal expansion

coefficients, particularly for the post system, have to be taken into account in the design. In a test series, the influence of gas carburizing, oil adhesion (quenching medium) to air at the chamber outlet, and the washing agent for cleaning were analyzed. The gas atmosphere and the washing process were not shown to have an effect on the material. However, with atmospheric oxygen, the unavoidable drops of oil on the workpiece fixture led to flame formation and thus to temperatures above 350 °C.



Fig. 3: Production batch comprising CFC workpiece fixtures, 11-layers, in front of the furnace door
(Source: HEAT Holding)

With an additional measure to the heat treatment facility, this situation was reliably improved and maximum temperatures of 350 °C in air are ensured (Fig. 3).

Loading takes place at the stations already set up for this purpose. The existing infrastructure can be used without restriction for the CFC workpiece fixtures. However, Fig. 2: Comparison of the mass of cast metal and CFC with the same strength at 1,000 °C [3] Fig. 3: Production batch comprising CFC workpiece fixtures, 11-layers, in front of the furnace door (Source: HEAT Holding) 2-2017 heat processing 43 Heat Treatment REPORTS system operation is such that employees must be given the relevant training. The slim design and much lower weight initially create the impression of insufficient stability. Employee training includes handling when loading and unloading, internal transport with forklift trucks and storage on magazine stations outside of batch operation. A process description, including illustrations, is useful and is supported by the experience of Graphite Materials GmbH. Taking account of the heat treatment parameters, component costs, quantity per delivery date and process conditions, the following requirements were developed:

- Components per batch (plant capacity)
- Furnace loading of max. 1,500 kg
- Usable furnace space (860 x 1,170 x 1,100 mm)
- Cast base tray for linking the CFC grid (860 x 1,170 mm)
- Fixture service life of min. 1000 furnace runs.

The structural design criteria are derived from:

- Loading density (parts per layer)
- Throughflow (heat dissipation)
- Components loading methodology (contact surfaces)
- Load bearing capacity (load/volume)
- Ability to replace damaged fixture elements
- Cast base tray: cast CFC thermal expansion.

The CFC system produced is shown in Fig. 3. Compared with the cast variant, the number of pieces can be increased from 2,304 to 4,312, namely by 87 % (Table 1).

Table 1: Comparison of piece numbers and mass for cast and CFC fixture

		Cast	CFC	Delta	Delta [%]
Pieces	[off/charge]	2,304	4,312	2,008	87
Piece mass	[kg/charge]	640	1,199	559	
Cast basket	[kg]	15.5			
Cast layer	[kg]	25			
Cast base layer	[kg]	70	70		
CFC layer/grid	[kg]		15.3		
Rack mass, unloaded	[kg]	633	240	393	62
Charge mass, loaded	[kg]	1,274	1,440		
Charge-utilized capacity (max. 1,500 kg)	[%]	43	80		

*The slim design reduces the dead mass by 393 kg. In this way, depending on the components, there is a 60 % reduction in fixture weight and this enables a larger number of pieces (packing density). The weight of the CFC fixture includes a cast base tray (70 kg). It should be noted that, due to the advantageous CFC material properties, an optimization of the cast design (baskets) was not considered. The batch volume is calculated according to the maximum weight of 1,500 kg of the furnace. The comparison between cast and CFC clearly shows that for this drive component (piece * component mass) 80 % of the furnace capacity are useable thanks to the CFC design. This corresponds to almost twice (87 %) the batch volume.*

PRACTICAL EXPERIENCE

The CFC fixture has now been in use for eight months or 200 furnace runs and has proven successful. Via the link to a cast layer, the loading and unloading stations already set up could be used in full without the need for any additional input. Staff were trained and the plant was subsequently commissioned. Due to the much lighter layers (Table 1: 15.3 kg), employees were on board from the start and carefully integrated the system in the process. The physical strain on employees is much lower, concentration improves and there is a lower risk of injury. CFC is almost distortionfree (3) with the result that the component loading remains unchanged in the position and form compared with the virgin state of the CFC layer (Fig. 4).



Fig. 4: Component loading in the cast basket and the CFC layer (not to scale)

The components sit reproducibly in a fixed position in the layer. There is no risk of jamming due to the distortion of the fixture. Loading and unloading is accelerated and can be standardized by means of a semi or fully automatic procedure. Due to the higher packing density the heating, quenching and tempering processes are slightly longer for CFC loading. In this case, the number of pieces prevails over the different energy requirement compared with cast. The dwell time in order to achieve the case hardening depth (CHD: approx. 1.2 mm) remains constant, independent of the component. However, overall, the process time for the total number of parts (5 million pieces) is reduced by 50 % to 14,000 h. Due to the solid component cross section, component distortion as a result of heat treatment is not critical. However, the lack of distortion of CFC is a key advantage for the reproducibility of heat treatment. The layer does not have to be turned around in order to correct bending and can only be used adequately due to the post system. This excludes the possibility of a malfunction. The structure is designed to enable the replacement of damaged elements. Individual layers were damaged in an accident. The components affected were dismantled by the fixture manufacturer and replaced with new elements. The stability and functionality of the repaired levels have been completely restored. In principle, industrial practice with CFC workpiece fixtures shows that professional staff training, including repeated training of temporary employees, is essential for successful operation. The negative aspect of the slim design is a greater susceptibility to impacts. Careless transportation or setting down are the most frequent causes

of damage. However, as a rule, the much simpler and easier operation improves employee satisfaction and this, in turn, leads to more careful handling.

CONCLUSION

The weight saving when using CFC rather than cast fixture materials is significant, however, it depends on the components loaded. In this example, the fixture mass can be reduced by approx. 60 %. With CFC, the material properties load bearing capacity and stiffness can be used for a slim design enabling higher packing density. With the same fixture basic dimensions and chamber height, 559 additional components can be processed per furnace run and the oven capacity increased by 87 %. The greater capacity reduces the total process time for the customer order in this example by 50 %. The lack of distortion of the workpiece fixture facilitates loading and unloading and the reproducibility of the treatment results. Simplified handling procedures, particularly thanks to weight savings and lack of distortion, increase employee satisfaction, occupational health and safety and support process reliability. The effects of the CFC fixture described here create benefits for the industrial partner and these can be measured in terms of an increase in added value. We would like to thank Marco Liebsch and Frederic Stackfleth, both from Gruppe HEAT, for their outstanding support.



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SECO/WARWICK Organizes Heat Treatment 4.0 e-SEMINAR

Aug 28, 2020

SECO/WARWICK – the leader in heat treatment and vacuum metallurgy – will



hold the industry's first virtual meeting of international specialists, and will share their knowledge and experience online. Expert Wednesday, September 9, includes 3 thematic blocks, speakers from around the world, discussion panels, thousands of participants, with scientific and business disciplines in one network of connections.

In brief:

- Expert Wednesday, 9/09/2020,
- 15.00 – 18.00 Central European Time (CET)
- 3 hours of online meeting – 3 thematic blocks – 3 TV expert studies,
- 3 parallel thematic rooms, i.e. 9 hours of lectures, panels, discussions, interviews,
- Your choice of topic and meeting room,
- admission: US\$12.99 – \$1 donated to charity,
- strengths of science, industry leaders, business giants, component manufacturers or suppliers – the whole world of heat treatment and metallurgy in one place,
- 360-degree view of the industry,
- unique topics and materials, exceptional speakers, as well as recordings and access to the event archive,
- range – global, counted in thousands of participants,
- language of the event – English,
- broadcasting – only on-line.

The price includes:

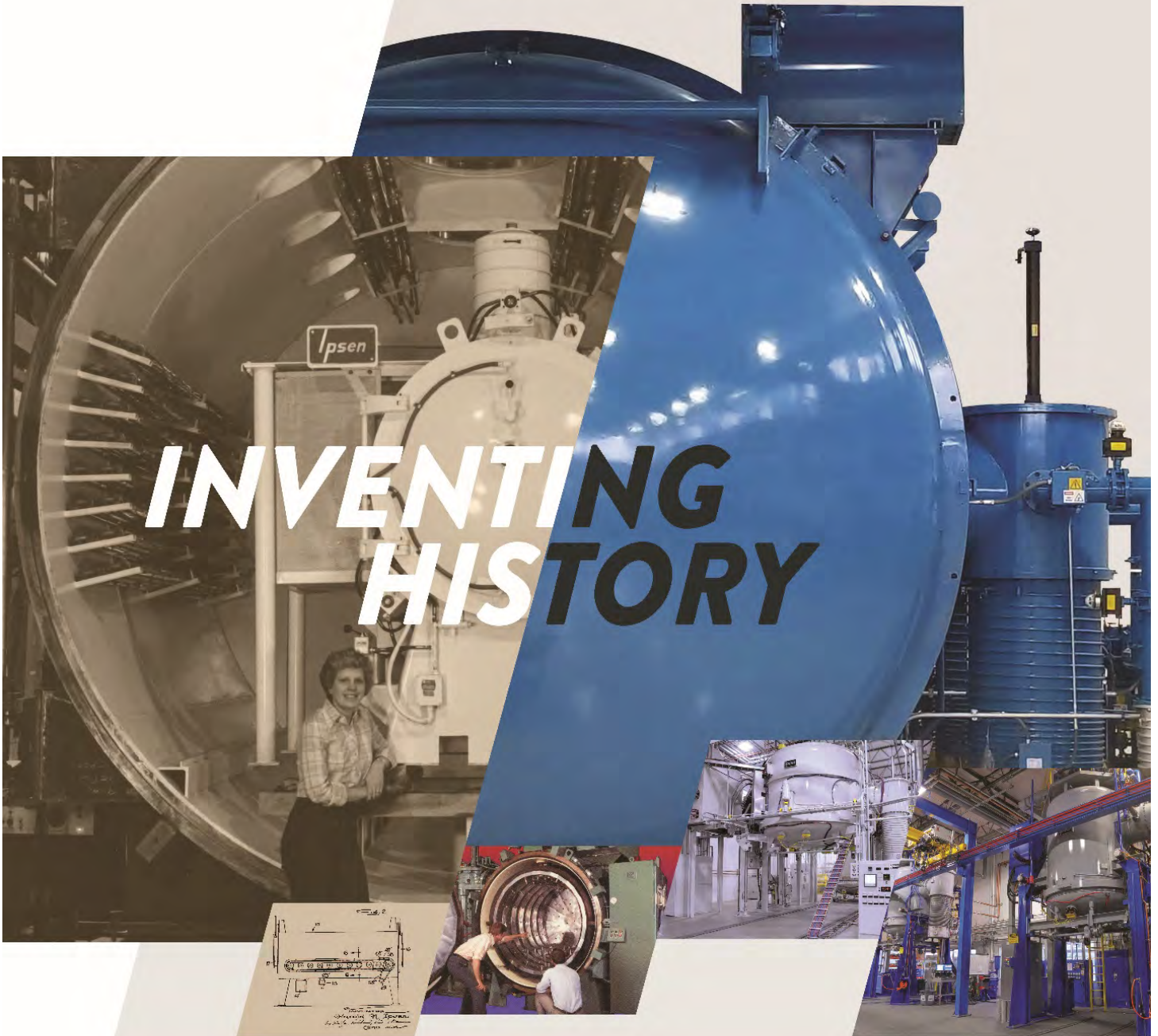
- access to 3 virtual meeting rooms,
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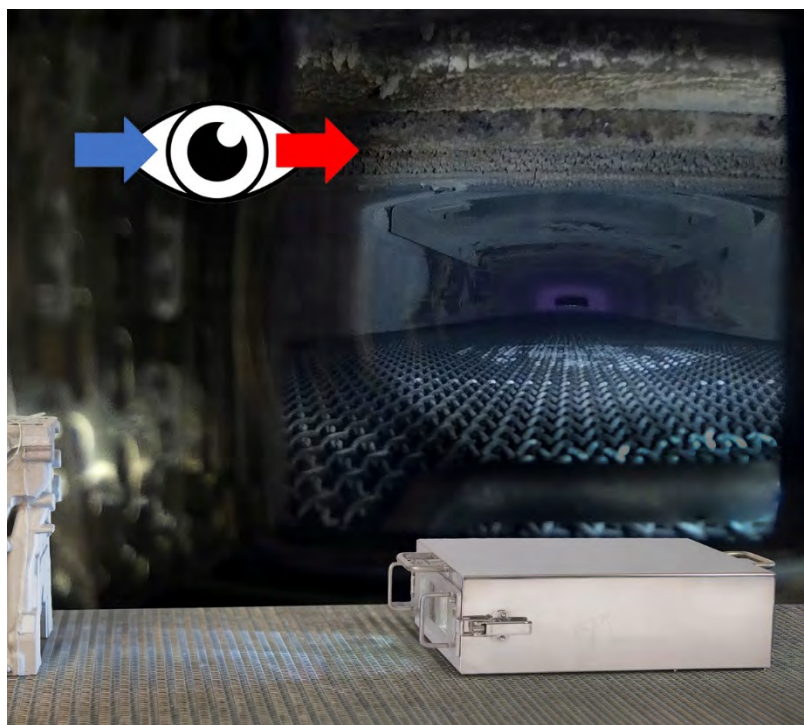
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designed to provide thermal protection for both 4K high definition video camera and high temperature torches, providing an independent light source to ensure picture quality and definition. The resulting video "Optical Furnace Profile" show process engineers so much about how their process is operating without any need to stop, cool and dismantle the furnace. This allows safe routine

furnace inspection without any of the problems of costly lost production and days of furnace down time. From the video evidence, the root cause of process problems, possibly already highlighted by running the PhoenixTM temperature profile system, can be identified accurately and efficiently. Furnace structural damage or faulty furniture such as recirculating fans, control thermocouples or heater elements can be detected. Buildup of unwanted flux within the furnace can be monitored allowing accurate service and clean down schedules to be planned preventing future unplanned costly line stoppages. Damage or distortion of the conveyor belt compromising the safe smooth transfer of product through the furnace can be isolated with

accuracy helping reduce corrective action turnaround times. Backed up with efficient local service and technical support the PhoenixTM Optic system is a valuable new addition to the process or maintenance engineers PhoenixTM tool kit.



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Nitrex Poland Expanding

Aug 27, 2020

Scan through this news item and you will see that Nitrex is adding a large expansion to their manufacturing facility in southern Poland. When we at “The Monty” visited this facility a couple of years ago this is what we saw (below). In the pictures you see Gord Montgomery and the founder of Nitrex Mr. Michael Korwin.

“Nitrex Metal has started the expansion work of its manufacturing facility in Sosnowiec, Poland. Construction of the new building began in May 2020 and is slated for completion in March 2021. The new 2-story building will be connected to the west façade of the adjoining building, and as a result of this expansion, an additional 21,500 square feet (over 2000 m2) of new space will be added, almost doubling the size of the current building. Nitrex moved manufacturing operations to a new plant in Poland more than ten years ago to enhance its manufacturing competency and reduce the complexity of the supply chain. Since starting its operations in Poland in 2008, the product portfolio has expanded from building Nitrex turnkey nitriding and nitrocarburizing systems to include the production of UPC-Marathon probes, analyzers, and controllers. Centralizing the European production and distribution facility under the same roof allowed UPC-Marathon to streamline operations, boost its efficiencies, and gain access to R&D support and expertise for future product developments.

“This expansion project reflects our commitment to continuous growth and will enable us to scale up production to stay abreast with the global customer demand for turnkey nitriding systems and furnace control upgrade solutions. Our vision is to build a strong and sustainable company and be a source of stability for our employees, customers, partners and community. The investments we are making today to enhance our production capacity will allow for a quicker response to market demands, help to accelerate new product initiatives, and provide space for future growth,” said Iwo Korwin, President, Global Nitrex Turnkey Systems (NTS). Adam Siwek, Production Manager at Nitrex Poland, who is overseeing all aspects of the construction project is excited about the next phase of Nitrex’s growth. “After a year of planning and despite the delays in the planned construction due to COVID-19, construction is now pushing forward. The expansion is not only limited to factory space but also includes offices and warehouse space, a new state-of-the-art research laboratory furnished with a Nitrex compact nitriding furnace for process development and testing purposes, as well as a technology

laboratory fitted with a large capacity test furnace for conducting probe evaluations and certifications,” said Adam.”





Accurate Brazing, From This to This

Aug 27, 2020

Back in December of 2019 we had the press release below from Accurate Brazing in Greenville, SC about adding a second HIP unit. Well it looks to us like the installation is now completed and ready to go.

Accurate Brazing Adds Second Hot Isostatic Press from Quintus Technologies
"Västerås, Sweden, November 19, 2019 – Accurate Brazing, a full-service provider of specialized heat treating solutions, added Hot Isostatic Pressing (HIP) to its thermal processing capabilities earlier this year. "Based on overwhelming feedback from the marketplace, we are pleased to be moving forward with our second Hot Isostatic Press from Quintus Technologies," says Steven Francis, president of Accurate Brazing. Both presses are of the model QIH 122 M URC®. They are equipped with the Quintus proprietary uniform rapid cooling (URC) feature, which combines HIP and heat treatment in a single process. This process is called High Pressure Heat Treatment (HPHT), and it streamlines the steps involved in material densification and heat treatment. This innovative approach also enables all processed components to cool uniformly, resulting in minimal thermal distortion and non-uniform grain growth. "The Quintus technology allows us to shorten lead times, improve product metallurgy, and eliminate some additional outside operations, which is very attractive to our customers," says Mr. Francis. Accurate Brazing serves the aerospace and power generation industries, as well as other sectors that demand high quality and short lead times. Many of Accurate Brazing's customers utilize additive manufacturing (AM). "The versatility of the Quintus units makes them well suited for our service business model," says Mr. Francis.





HK 2020 Exhibition October 21-22/2020

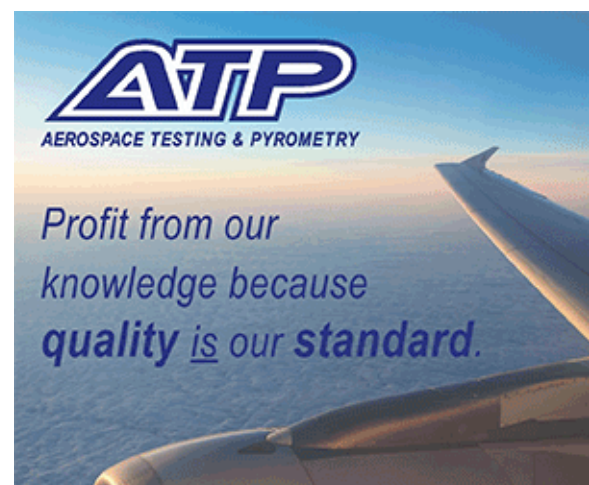
Aug 27, 2020

It breaks our hearts that we not be able to attend HK 2020, the annual German heat treatment exhibition held the last few years in Cologne. The reason of course is COVID-19 and bearing that in mind we now have some details about the HK2020 “Virtual” show. We reminisced about the show last year and came up with this photo of the “Wickert” booth which we visited last October.

“21 – 22 October 2020 online. This year, the HK of AWT is again the leading event for developments in materials technology and the communication platform for the heat treatment industry and its suppliers. At the beginning of August the new website of HK www.hk-awt-2020.de went online. The scientific programme of the HK 2020 is more open to new materials and fields of application and at the same time more practice-oriented. On the first day, three papers on new material developments will be presented and there will be a lecture on creative techniques from the AWT’s “Trendscouting” expert committee. On the second day the focus will be on current topics in the practice of hardening shops. Keywords: CQI-9, energy efficiency and operational safety in hardening plants.

This year, a virtual trade fair platform will be offered on the website for the first time. Exhibitors of the HK can publish their product presentations, image brochures, press releases and videos there and present in this way their news to the heat treatment community. A chat tool and video call will be activated during the congress time. The website is public and free, there are no barriers due to logins. AWT offers attractive participation fees for the online-conference, especially for groups. At the end of September, the

programme booklet will also be available to the public as an e-paper on the website. Detailed information and registration at www.hk-awt-2020.de For more information about the conference and the booking of virtual stands please contact Ms. Sonja Mueller by s.mueller@awt-online.org.”



US/Canada Border Closed

Aug 26, 2020



As a Canadian and a businessman I am very aware that the US/Canadian border is closed to all but essential travel, however US citizens are not as aware of this situation. The bottom line is that while Canada does allow visitors from other countries, those visitors must self-quarantine for 14 days which is impractical for most individuals. And by the way the Canadian government does take it seriously, no tracking of movements by phone, those self isolating are checked on a random basis in person with large fines for not complying. An example of essential travel would be trucking and installation engineers, non essential travel would be sales people. Its interesting that it is far easier for Canadians to access the US than visa/versa. This really annoying situation has been going on for months now and looks to continue for many more months. One more effect of COVID-19.



Rex Heat Treat Installs SECO/WARWICK Super IQ Furnace

Aug 25, 2020

To this rather interesting press release we can add this background about REX Heat Treat. To find out how Rex compares in size to other North American commercial heat treaters we would suggest checking out “**The Monty**” which offers the only ranking in the world about the relative size of commercial heat treaters in North America <https://themonty.com/project/largest-north-american-commercial-heat-treats-august-2020/>

“Rex Heat Treat is a family owned-and-operated business that began the year of 1938 in Pennsylvania. In its beginning, Rex Heat Treat supported the United States military efforts during World War II. Since then, Rex has also managed heat treating plants in Georgia, Florida, and Alabama. Through a combined 190,000 square feet, between the Alabama and Pennsylvania facilities, Rex Heat Treat is able to effectively serve industries, such as Mining and Drilling, Energy, Aerospace and Defense, and Transportation. With the installation of the world’s largest Vertical Vacuum Oil Quenching Furnace, Rex Heat Treat is primed for continued growth.”



“Rex Heat Treat, a commercial heat treater specializing in the aerospace market, has become the first company to install and commission the new Super IQ® Gas Carburizing furnace. Over the past

several years, Rex has commissioned several new SECO/WARWICK Group vacuum furnaces at their Lansdale, PA location as part of a plant modernization initiative. So, when Super IQ was introduced in 2019, it represented another opportunity to upgrade their through-hardening and carburizing capabilities alongside their legacy harden and temper furnaces,

while using their existing loader, baskets and washing system. Super IQ was designed specifically to eliminate the need for endogas, and its inherent flames and carbon monoxide dangers. Instead, Super IQ allows clean processing and can even achieve higher temperature carburizing to speed cycles and improve yields in certain steels in a clean and cool manner. Parts also come out much cleaner and brighter.”

Firearms Heat Treatment

Aug 25, 2020



August 21, 2020 we had a news item about how a bright spot in the worldwide heat treatment industry is that of firearms (the original note can be found below). A perfect example of that would be Italian gun manufacturer Beretta. Up until 2016 Beretta had been manufacturing in Maryland, USA but due to the states very tough anti gun laws the firm moved to Gallatin, Tennessee and inaugurated the facility April 15, 2016. The 160,000 square foot facility will house the entire **R&D and manufacturing division of Beretta USA** which, while keeping its historical headquarters in Maryland, will count on a state-of-the-art production plant that will allow for a significant increase in production capacity. This modern plant is based on the highest standard of the “lean production” and features cutting edge industrial and information technologies, which will allow to greatly increase the efficiency of the production processes. This facility has a very modern in house heat treating department which features vacuum heat treating as well as other processes including salt quenching. And guess what? The company can’t keep up with the business and the heat treat department is running at full capacity.





TAILORED SOLUTIONS FOR METALLURGY APPLICATIONS

Nutec Bickley Installs Roller Hearth Furnace

Aug 25, 2020



Furnace builder Nutec Bickley in Monterrey, Mexico recently installed a roller hearth furnace at a Mexican supplier of forged parts for the auto industry. The furnace will be normalizing automotive parts and other motor system components, for instance for motor vehicles and truck tractors. The system has an automatic parts feeder, is gas fired and is designed to operate at 1,000C (1,830F). "The Monty" visited Nutec a couple of years ago and the attached photo shows a large continuous furnace under construction. www.nutecbickley.com



Monday Morning Briefing

Aug 24, 2020



Powdered Metal parts supplier **Capstan Inc.**, based in California is in the process of installed a brand new **Abbott** sintering furnace and nitrogen system at their facility in Guadalajara, Mexico. The installation will be completed by the fourth quarter of 2020 and this investment will bring this plant in line with others the company has around the world. Interesting enough the company issued these comments about why they invested in Mexico rather than China; *"When looking at China vs. Mexico manufacturing, labor rates in Mexico are now, in many cases, lower than China. In constant dollar terms, hourly manufacturing wages are lower than those in China. Mexico also offers much steadier wages, making it easier for companies to forecast manufacturing costs. As of 2019, the fully burdened direct laborer wage rate in Mexico is about \$3.95 per hour vs. \$4.50 per hour in China."* - www.napsintl.com



Earlier this summer we mentioned an auction at **FCA** in Kokomo, Indiana which featured 4 vacuum nitriders (to provide some background the Fiat Chrysler transmission facility in Kokomo has one of the largest captive heat treating departments in North America). We speculated at the time that probably these would easily find a home although the large size would deter

some potential buyers. As it turns out 3 of the 4 were scrapped which surprised us. These photos show some of the units.



IWT Accepts Rohde Furnace After Successfull Testing; In Bremen, Germany we find IWT (Institute fuer Werkstofforientierte Technologien) a research organization dedicted to heat treating which is jointing funded by German industry and the university. We at "The Monty "have visited this facility several times over the years and have found it to be very facinating. The organization has been working with German furnace builder **Rohde**

Schutzgasöfen GmbH to develop a new design of furnace and this is the end result.

"The bell hardening center is designed as a classic plant concept with a wide variety of applications designed to cover several different heat treat processes. Due to its modular design the system can easily be expanded to accommodate future developments. It requires a minimal amount of floor space despite the fact that it is completely automated and can handle up to three consecutive batches without manual intervention. The system is extremely efficient because of its excellent thermal insulation, innovative cooling concepts and coordinated furnace construction materials, especially at high temperatures. The main characteristics of the bell hardening center are its modular design and the possibility for expansion with additional tempering furnaces and other components such as cleaning systems and quenching tanks. In fact this hardening center can replace batch furnaces designed for low pressure carburizing. Other important features include the small footprint, due to the facts that it is loaded at different levels, faster heat-up and cool-down to hardening temperature, faster atmosphere composition and more. This system offers oil, salt and gas quenching and has a work zone of 500mm x 600mm. Gases used are nitrogen, air, methanol, ammonia, propane and acetylene."



In the picture from left to right: Ingo Bunjes IWT Bremen, Dr.-Ing. Matthias Steinbacher IWT Bremen, Raphael Nees, Natasha Rohde, Konstantin Rohde, Jörn Rohde, Vincent Rohde.

We see that **Al Baethke** retired just a few weeks ago. Al was with US commercial heat treater **Paulo** for over 28 years as VP of Engineering. Find out how Paulo compares in size to other North American commercial heat treaters here <https://themonty.com/project/largest-north-american-commercial-heat-treats-august-2020/>

From **SECO/WARWICK** we have this press release about a new order they just received from Harsha Engineers in India; *“**Harsha Engineers Limited**, a leading bearing cage manufacturer in India, who has manufacturing facilities in India, China and Romania and who has Customers across 5 Continents, ordered yet another ferritic nitrocarburizing furnace with ZeroFlow technology from SECO/WARWICK. The technology ordered by Harsha is dedicated to Ferritic Nitro Carburizing of bearing cages and was ordered to: improve quality of nitrocarburizing, reduce total cycle and operation cost, meet specific color requirements, and finally provide excellent batch uniformity. The furnace is equipped with a vacuum system, gas control system, turbo cooling, atmosphere cooling system and post oxidation system to get a material very uniform grey color and other tribological properties to meet the specifications of leading bearing manufacturers.*

From Oven builder **Grieve** comes this press release; *“550°F TRUCK OVEN; This Grieve oven is a 550°F (288°C) new truck oven customized from the standard TCH-550 model and is currently used for heat processing parts at the customer’s facility. Workspace dimensions of this oven measure 60” W x 60” D x 60” H. 30 KW are installed in Incoloy sheathed tubular heating elements, while a 2000 CFM, 2 HP recirculating blower provides horizontal airflow to the workload. This Grieve truck oven has 6” insulated walls, an aluminized steel interior and aluminized steel exterior with enamel finish. Features include a purge timer, two-position*



dampers on fresh air inlet and exhaust outlet and a 1200 lb. capacity stainless steel loading truck.”

Somebody is in trouble! We see that auto maker **Kia** is not sure whether some driveshafts were heat treated or not which is not a good thing; **Vehicles Affected:** Approximately 830 model-year 2019 Kia Forte sedans. The Problem: The left front axle driveshaft may not have been heat-treated, which can cause it to break, resulting in a sudden loss of drive power and increasing the risk of a crash. To round things out we have this photo from **Byron Stewart**. Byron is originally from Australia and his father **Tom Guler**, was a very prominent furnace builder for many years. Byron for the past few years has been designing and building vacuum furnaces for the Chinese market and this is an impressive example. The line you are looking at has two 6 bar vacuum/pressure hardening furnaces and 4 vacuum tempers tempers all designed to heat treat H13 extrusion dies, 1800 mm in diameter and 450 mm thick. The system is being installed at a facility in Yingkou China and should be in operation shortly after a 9 month standstill due to COVID-19.



Ipsen Reports Strong Start to Third Quarter

Aug 21, 2020

“Despite uncertain market conditions presented by the Coronavirus pandemic, Ipsen saw an increase in orders placed during July, building positive momentum for the third quarter. Ipsen was awarded five vacuum furnace orders between four customers, each with unique process requirements in the aerospace, defense and commercial heat-treating industries. The product mix varies from MetalMaster® to TurboTreater® to Ipsen’s signature Vacuum Aluminum Brazing furnace, all designed to meet the customers’ specific needs. In addition to the five new orders, Ipsen shipped nine furnaces in July to customers across six states in America as well as Canada and the United Kingdom.



“Ipsen has worked with international operations

teams for decades, shipping equipment from the US to countries all over the world,” said Ipsen USA President and CEO Patrick McKenna. “With the identification of Ipsen USA as the Vacuum Center of Excellence, we can continue servicing those companies with the level of quality they expect and deserve.” Orders this year have included a healthy blend of new equipment, aftermarket parts, service and retrofits. Ipsen is hopeful this upward trend will continue through the fourth quarter. For more information on Ipsen’s vacuum furnace product offerings, visit IpsenUSA.com.

Ipsen is the global leader in heat treatment solutions with more than 10,000 operating systems in 70 countries. Through its Global Centers of Excellence in Vacuum and Atmosphere Equipment, Ipsen] continues to deliver innovations in technology that advance thermal processing while helping customers achieve their goals. Focused on performance and quality, Ipsen supports

commercial heat treaters and customers in many industries including aerospace, automotive, energy and medical. With locations in North America, Europe and Asia, and the largest service team in the industry, Ipsen is committed to providing 360° support for customers worldwide.”

Firearms-A Bright Spot in the Heat Treatment Industry

Aug 21, 2020



There is not the slightest reason for us to state the obvious; in the age of COVID-19 the vast majority of captive and commercial heat treaters alike are not having a good year with one exception-firearms! Every single company which heat treats gun components or munitions either in house or commercially is busier than s**t these days due to the extraordinary growth in gun sales. As we all know in uncertain times people buy weapons and these are certainly very uncertain times. As an example we know of only 1 large, used mesh belt quench and temper line being sold in all of 2020 and it sold sight unseen to a munitions supplier in the US Midwest just a few weeks back. So while things might be rather dismal these days we can take solace in the fact that some heat treaters are doing quite well these days.



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Roctel Induction Heating Equipment Auction

Aug 20, 2020



July 30, 2020 saw an auction at auto parts supplier Roctel in Guelph, Ontario, Canada (we should point out that while the auction was at Roctel the equipment was actually owned by General Motors). Included in the auction were a number of different items including spline rollers, washers and particularly of interest to us a couple of very impressive Induction Heating systems, specifically an Inductoheat Induction Heat Treat Equipment, Model # Inductoscan, Serial # ME 20354 and an Inductoheat Induction Heat Treat Equipment, Model # I/S-UP16-300-10, Serial # ME 45093-1. Auctions are funny things in that sometimes items are sold at wildly inflated prices, other times at a fraction of their true value. In this particular case the induction systems sold for well under \$50,000 which we would consider to be very much on the low end of their value.



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Hauck Heat Treatment, Eindhoven Completes Expansion

Aug 20, 2020



Hauck Heat Treatment, the second largest European commercial heat treater as ranked by “The Monty” <https://themonty.com/project/largest-european-commercial-heat-treaters/> recently completed the expansion of their Eindhoven, Netherlands facility. The final additions were two brand new vacuum furnaces which were added in the spring of 2020, one with an all metal hot zone, while the second has a graphite hot zone. With these additions the facility (which actually consists of two separate halls) now has a total of 12 vacuum furnaces, 8 with graphite hot zones and 4 all metal.



Where Are They Now-Don Longenette

Aug 19, 2020



Because of his years spent in the North American heat treat industry with companies such as Timken Bearings, Bodycote and Thermal Process Holdings Don's is a name which is easily recognized by many. To take it one step further as Don was involved in heat treat start ups in Mexico, India, China and

Thailand we could say that his name is well recognized even outside of North America. A year ago he surprisingly enough left the heat treating industry, however we all know nobody can ever actually leave the business which is why we were not surprised that he now is back and has set up A+ Heat Treating Services,

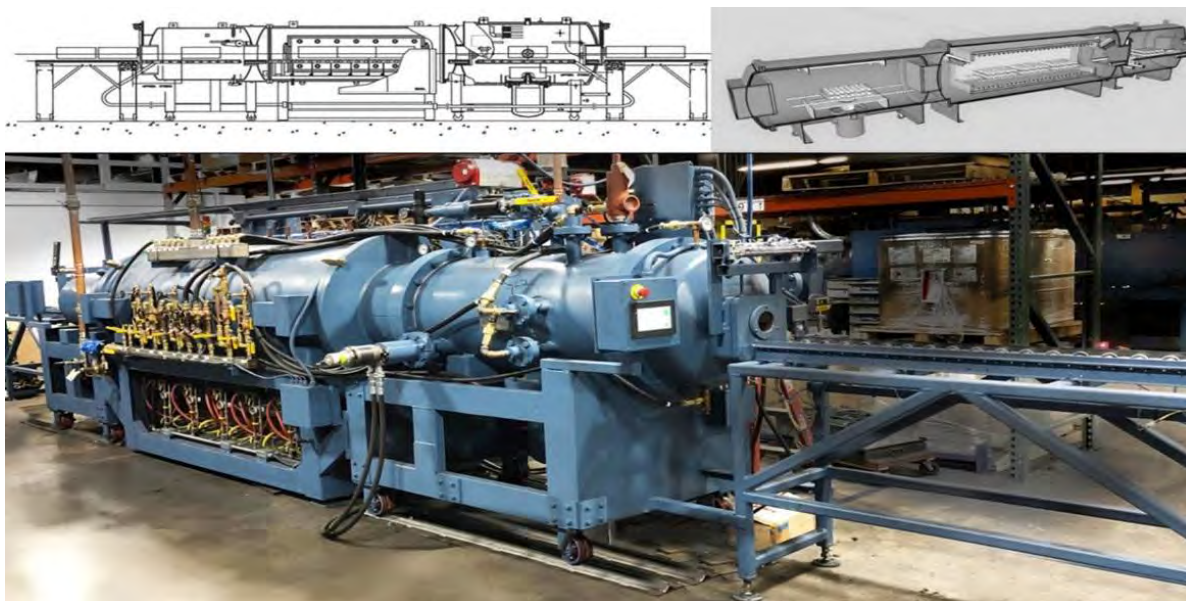
LLC., in the Cleveland, Ohio area. While we are not at liberty to say what he will be doing we can say that we will be providing more details in the near future. We hunted around for a suitable picture and found this one from a few years back. Gord Montgomery is on the left and Don is on the right.



Gasbarre Thermal Processing Systems Delivers Vacuum Furnace System for Aerospace Manufacturer

Aug 19, 2020

"Gasbarre Thermal Processing Systems is pleased to announce the recent shipment of a Continuous Vacuum Furnace with 10 BAR pressure quench capabilities to a major aerospace manufacturer in North America. The 4 position, 4 zone furnace is rated to 2400°F. The independent load and quench modules allow the heat module to hold temperature and vacuum creating an extremely pure environment. Extended heating element coverage allows for excellent temperature uniformity. As only the workload is cooled in the isolated cooling chamber, it makes for a very efficient system. Quick transference from the heat module to the cool module and fast quench capabilities make this an ideal vacuum furnace to process medium to high volume parts. Gasbarre was chosen as the equipment supplier based on proven performance from past projects with this manufacturer, as well as, extremely low down time metrics with their existing Gasbarre vacuum furnace equipment."



With locations in Plymouth, MI, Cranston, RI and St. Marys, PA Gasbarre Thermal Processing Systems has been designing, manufacturing, and servicing a full line of industrial thermal processing equipment for nearly 50 years. Gasbarre's product offering includes batch and continuous thermal processing equipment for both atmosphere and vacuum applications as well as a full line of alloy fabrications, replacement parts and

auxiliary equipment which consists of atmosphere generators, quench tanks, washers and charge cars. Gasbarre's equipment is designed for your process by experienced engineers and metallurgists that understand your requirements."

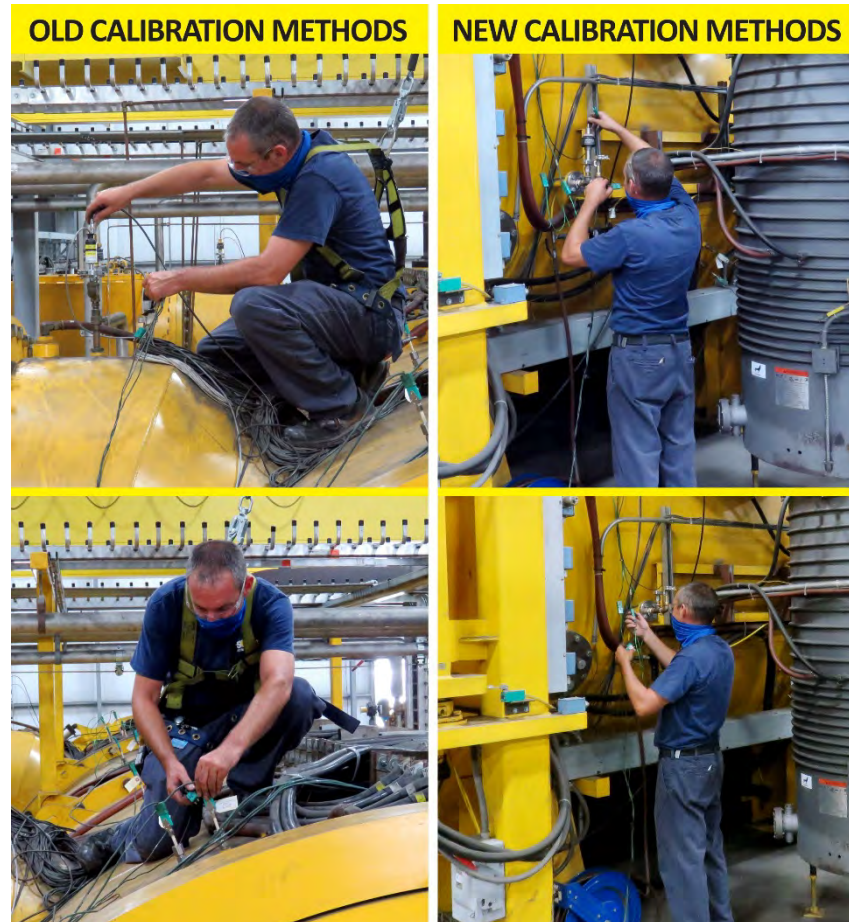
Solar Atmospheres Strives to Be Safer

Aug 19, 2020

"The COVID-19 pandemic sparked an unprecedented downturn in business, one that President Bob Hill has not seen in his 25 years with Solar Atmospheres. It was during this pause in activity, that Bob and his team decided to take a deep dive into their business practices, especially examining the safety procedures of all employees.

During a recent safety meeting, a quality technician reported that performing quarterly thermocouple and vacuum calibration

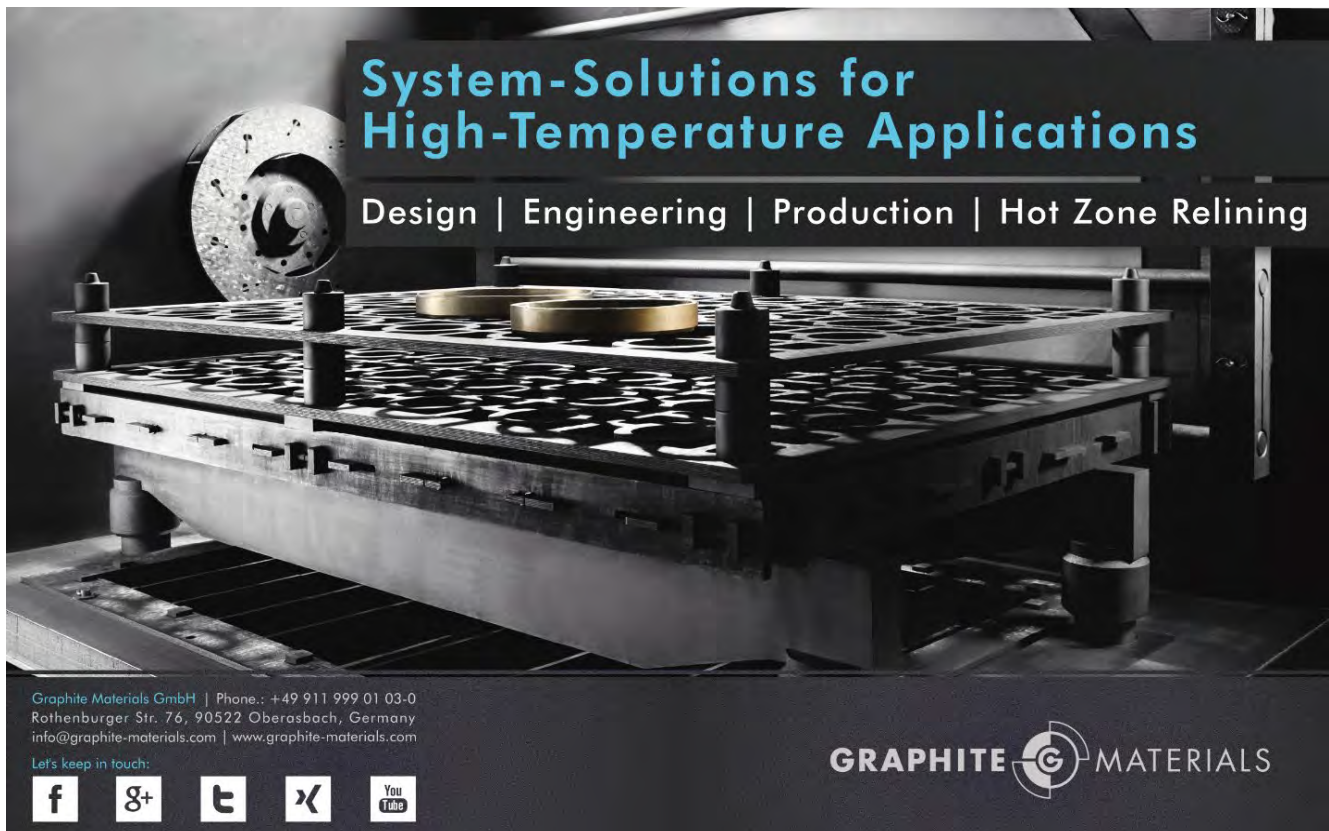
duties were exponentially more hazardous on larger vacuum furnace chambers. To calibrate against a standard, the technician must access plug-in points, which are traditionally located on the top of a furnace- the main valve port, used for vacuum calibration and the various Type S thermocouple contacts, used for thermocouple calibrations. Most smaller furnaces could be accessed easily with a step ladder deeming the climb reasonably safe. However, on larger chambers, the plug-in points could not be accessed by a ladder. Therefore, tying off, climbing, and balancing oneself 12 feet in the air became the only mode of access to these critical points.



“Our team worked extremely hard to devise a system that enabled the calibration process to occur with two feet on solid ground” said Hill. “For the thermocouple calibrations, our team ran extension wires from the TC’s with plugs to chest height. Additionally, we identified unused ground level feed through ports within the chambers and adapted them for vacuum calibrations.” Solar’s quality team validated the appropriate data from these procedural changes. These continuous improvement initiatives yielded no negative effects on the calibration results and dramatically reduced a potential unsafe work hazard.

Solar Atmospheres of Western PA’s maintenance team is proactively making these modifications to all existing furnaces, no matter the size. Our supplier of choice, Solar Manufacturing, now plans to incorporate these safety features as an option on all future furnace builds.

Solar Atmospheres of Western PA will continue their unwavering commitment to a safe and healthy workplace environment, to ensure additional accident-free years for future generations.”




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Dr. Ing. Rolf Terjung-CFC Fixturing For Vacuum Furnaces

Aug 18, 2020

Last week we had a very well written article about CFC fixturing in vacuum furnace applications, the person responsible was Dr. Ing. Rolf Terjung, Managing Director of Graphite Materials of Germany <https://themonty.com/cfc-fixtures-quality-fixturing-for-vacuum-heat-treating/> To compliment that article we have this press release from Graphite Materials telling us about an anniversary for the company and a birthday for Rolf. Also included is a photo of Graphite Materials taken October of 2019 when we last visited the company.

“2020 is an outstanding year for Graphite Materials: For 20 years now, our team is all about Special Graphite and his versatile application options. We will proudly celebrate the company’s anniversary in October. But one anniversary is not enough for us: Our managing director Dr. Ing. Rolf Terjung celebrated his 60th birthday! In 2000 he paved the way for a successful company career by founding Graphite Materials GmbH. He has been at the top of the company for the past two decades. With his commitment and dynamic nature, he managed to establish Graphite Materials as a successful brand in the industry. Needless to say that we wanted to honour him on his special day. But what should we give to a man whose heart beats for carbon? A simple voucher and chocolates were of course no option. We would not be Graphite Materials if we did not look beyond our horizons and carry out every project with a lot of passion.

So we started a mission according to our standard – from the idea to the finished component. We wanted to make a special gift: a three-dimensional bust of our boss – of course made of his favourite material: Graphite. To do this, we first had Mr. Terjung scanned from head to toe. After extensive programming, we finally went into production. We used one of our latest achievements in the machine park: our innovative 5-axis machining center. Thanks to its highly efficient way of working, we were able to machine the workpiece from all sides at the same time. This was the key to successfully completing the project. Several weeks passed from the vision to the finished gift. We watched everyone working at full speed. The team surprised our managing director with a unique and also artistic present that once again showed what Graphite Materials is capable of. We sincerely wish Mr. Terjung all the best on his 60th birthday and thank him for his great commitment. We look forward to further cooperation and to all the exciting highlights that will follow.”





custom-electric.com

Praxair Announces Name Change to Linde

Aug 18, 2020

"Danbury, CT, August 13, 2020 – Linde (NYSE: LIN; FWB: LIN) today announced that its U.S. subsidiary, Praxair, Inc., will begin operating under the Linde name, effective September 1. This name change reflects the company's evolution following the merger of Praxair, Inc. and Linde AG. Operating under the Linde brand, the company has established a vision to be the best performing global industrial gases and engineering company. The combined product and service portfolios of the new Linde offer customers more options to improve operational efficiency and plan for future growth. Linde remains committed to providing the same reliable, high-quality products and services that our U.S. customers have come to expect. With 80,000 employees in more than 100 countries, we are united behind our commitment to safety, integrity, community, inclusion, and accountability in all we do. We live our mission of making our world more productive. The primary customer contact for products and services will remain the same. Beginning September 1, information on the U.S. business may be found at www.LindeUS.com. The Customer Call Center will be available either by phone at the new 1.844.44LINDE or the new e-mail address contactus@linde.com.

About Linde; Linde is a leading global industrial gases and engineering company with 2019 sales of \$28 billion (€25 billion). We live our mission of making our world more productive every day by providing high-quality gases, application technologies and services which are making our customers more successful and helping to sustain and protect our planet. The company serves a variety of end markets including aerospace, chemicals, food and beverage, electronics, energy, healthcare, manufacturing and primary metals. Linde's industrial gases are used in countless applications, from life-saving oxygen for

hospitals to high-purity & specialty gases for electronics manufacturing, hydrogen for clean fuels and much more. Linde also delivers state-of-the-art gas processing to support customer expansion, efficiency improvements and emissions reductions.”



Nitrex Hires New Rep, Kittyhawk installs another HIP Unit and More Heat Treat News

Aug 17, 2020



We are going to start our Monday Morning Briefing with several “people” items from around the globe. First up we see that **Overton Chicago Gear** in Addison, Illinois, USA is looking for a Heat Treat Manager to run their captive/commercial heat treat department. Overton has a very interesting heat treat department, one that is clearly dedicated to large gears. As an example they have 3 pit carburizing furnaces capable of handling parts up to 90” in diameter as well as one of the largest press quench systems in the USA, a system which will handle parts up to 84” in diameter. The only one larger in the US that we can think of is located at **Timken Bearings** in Canton, Ohio. These two photos show part of their heat treat department.



From India we regret to mention the recent passing of **Shri O.P.Sekhri** of commercial heat treat **Lopan Metal Treatment Pvt Ltd**. Shri was involved in the heat treat industry since 1972 and his death was due to COVID-19 complications. Lopan runs a total of 18 sealed quench furnaces at 3 locations in Northern India.

From **Nitrex** we have this announcement about a new rep; *"NITREX is pleased*



to welcome our newest manufacturer representative, Mr. Ali Akgunes, for Romania and Turkey. Akgunes will handle the complete portfolio of G-M Enterprises (G-M) vacuum furnaces and UPC-Marathon (UPC, formerly United Process Controls) process and flow controls and automation solutions in Turkey. In Romania, he will also represent Nitrex for the sale of nitriding and nitrocarburizing systems in addition

to G-M and UPC products. Ali Akgunes brings over 20 years of experience in the metal manufacturing industry working closely with aerospace, defense, and machine tool companies. A solutions provider to hundreds of fabricated metal part manufacturers, Akgunes has earned a strong reputation among his customers for helping them maximize heat-treating operations with comprehensive manufacturing solutions and after-sales support services. Having worked extensively with both manufacturing and maintenance teams has also given him a realistic understanding of the needs and services of the industry."

Hector Ibarra who was Vice President of Operations at the **ALD Thermal Treatment** facility in Port Huron, Michigan recently parted ways with the company. This location is probably the largest commercial vacuum carburizing facility in North America. Commercial heat treater, **HI TecMetal Group Inc.**, based in Cleveland, Ohio, USA recently added an experienced fellow to their sales team; *"HI TecMetal Group is pleased to announce that **Ron Lozon** has joined our sales team and will be serving your area. Ron brings 41 years of experience in the thermal processing field to you."* From the UK we have this item from **Vacuum & Atmosphere Services (VAS)**; *"We are delighted to announce the return of **Lee Hollis**, adding to our already vastly experienced furnace engineering team. Lee, joined VAS in 2001 & completed his apprenticeship in 2005. VAS are extremely proud to that Lee went on to work on both atmosphere & vacuum furnaces until 2018. Now returning after 16*

months elsewhere, Lee contributes a wealth of knowledge & experience to the unrivalled furnace engineering team at VAS”.

Hot Isostatic Pressing has been in the news quite a bit this year and here is one more item about it, this from a company by the name of **Kittyhawk Inc.**, out on the US West Coast; *“Kittyhawk Inc Completes Installation of HIP Unit No. 2 at their new Oregon facility. In response to growing customer demand in the Pacific Northwest, they have installed another HIP Unit at the Canby, Oregon facility, this one with a working zone of 46” X 100”. Kittyhawk is a small family run business that has served the HIP needs of it’s customers since 1981. We are confident in our foundation and excited about the growth.”*



Precision Castparts Corp. (PCC) is an American industrial goods and metal fabrication company that manufactures investment castings, forged components, and airfoil castings for use in aerospace, industrial gas turbine, and defense industries. Since the beginning of this year the company has laid off 10,000 employees-30% of its workforce. We mention them today because



this represents an enormous blow to a number of commercial and captive heat treaters mainly located on the US west coast. And to round things out we go to the UK for this item. **Kepston Ltd.**, is a family run heat treatment company established in 1916 and based in the UK. Historically their business has been Continuous Bright Annealing and Brazing of Mild Steel, Stainless Steel and non-ferrous. Going back to 2015 the company decided to expand

into new markets such as aerospace, defence and energy which resulted in them buying a TAV Furnace with a hot zone 1.2m x 1.2m x 1.2m. Just recently they achieved NADCAP accreditation for heat treating. Congratulations is all we can say.

Grupo TTT Spain to Install Bottom Loading Vacuum Furnace

Aug 14, 2020



In Spain commercial heat treater Grupo TTT is making a large investment in the form of a refurbished Ipsen VVFC 60 × 60 bottom loading vacuum furnace. Vacuum & Atmosphere Services (VAS) in the UK originally advertised the furnace for sale and was also responsible for decommissioning the furnace and moving it to Spain. When travel restrictions are lifted the company will be reinstalling/building up & commissioning. <https://www.vacat.co.uk/>

Grupo TTT is a very large commercial heat treater with facilities in Spain and also a large plant in Querétaro, Mexico which operates under the name Aeroproces TTT-as a matter of fact we had a news item about Aeroproces earlier this year. This is how the company describes themselves; *“Grupo TTT is a full service technical solutions provider, serving clients in aerospace, automotive, machine tool, capital goods, paper, and the oil & gas markets, each market has specific requirements and quality standards.”* The company has also made our news section over the years owing to several press releases from SECO/WARWICK who have sold them a total of 4 horizontal vacuums over the years.



IHEA July Executive Economic Report

Aug 14, 2020



Industrial Heating Equipment Association (IHEA) is a US based organization which does a very good job of tracking the US economy in general and the heating portion of manufacturing in particular.

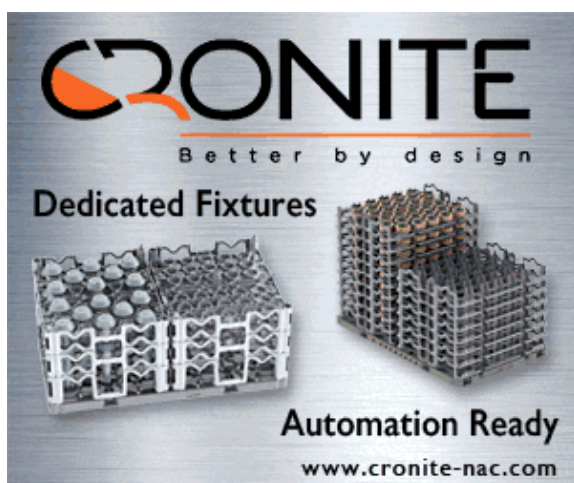
"There is one positive aspect when it comes to a dramatic drop as experienced in March and April of this year. When one has fallen that far there is nowhere to go but up! Since then there has been a steady improvement in almost every category. This month there was progress in all but one measure and even this showed only a very slight decline from the month prior. The overall economy has been showing signs of resilience and that is certainly a good thing, but the fact remains that much of this progress is tenuous. The assumption all along was that there would be a significant bounce back once the restrictions on the economy were lifted and in June and July that assumption proved accurate.

The progress that has been made thus far has been contingent on several factors. The first is that many businesses have engaged in rebuilding their inventories in anticipation of an eventual economic recovery. The hope was that this rebound would come in May of this year or at least this summer. That has not been the case and now hopes lie in a rebound by the fourth quarter. The second major motivator for recovery has been the willingness of the consumer to return to old habits as far as consumption. This has been a mixed experience as there has been some return to those old habits but there have also been many new habits formed and these have all had their impact on business.

Of the twelve index readings tracked, all but one trended positively and in some cases the numbers registered this month were better than they have been in over a year. The only reading that did not trend positively was steel consumption and that reading was stable and looked very similar to the last few months. Of those that trend positively, the majority remain distant from the readings that dominated at the start of last year. The data is showing a solid recovery in many areas but there remains a long way to go. For example, capacity utilization staged a nice rebound from 65.1 to 68.6 but that is still a very long way from the bottom of normal at 80. Sales of new vehicles jumped back from the depths but is still very far from the levels at the start of the year.

The more interesting data was found in those categories that seemed to have fully recovered and even exceeded levels seen earlier this year and at the end of 2019. The New Orders Index from the Purchasing Managers' Index was back to the 60s and that is a level that has not been seen in over a year. Given that the new orders sub-index is the forward looking part of the overall PMI, it bodes well for the recovery at the end of the year. There was also a nice jump in the transportation index and that also provides some confidence about the future. It also indicates there has been a significant change in everything from the traditional supply chain to the habits of consumers. The parcel delivery sector of transportation is booming but those sectors that are tied to exports and imports are struggling. The movement in the metals markets has been interesting as well. The hike in the prices of metal commodities such as copper or aluminum have more to do with the interest of investors than industrial demand. These commodities have started to regain their popularity as a hedge against future inflation.

The production indicators such as durable goods and factory orders have shown progress as business tries to rebuild inventory levels but there is ongoing concern regarding new demand. If the inventory levels get back to normal and there is no corresponding demand these levels will be a burden to the companies carrying them. The bottom line is that there is resilience in the economy despite the trials of the last few months. It now all depends on whether the pandemic necessitates a wider crackdown and a resumption of the conditions that collapsed the economy in the first place."



Abbott Furnace Installs & Commissions a Roller Hearth Tube Annealing Furnace

Aug 6, 2020

St. Mary's, PA: Abbott Furnace Company has recently installed and commissioned a roller hearth tube annealing furnace at an aerospace and defense products manufacturer that fabricates the most critical precision tubular products. The high temperature roller hearth furnace quench anneals superalloy tubing for their drawing operation. The electrically heated furnace is atmosphere tight and is operated with an argon protective atmosphere. The high-speed roll drive quickly transfers the tubing from the furnace to the water-spray quench.

The new furnace removes a bottleneck in production, with the increased number of tubes processed between tubing draws, and Mr. George Ray, Chairman of the Board, indicates that with the +/- 5 F furnace temperature uniformity, and the uniform water spray, the new furnace also provides much better uniformity of hardness than an older, retired furnace. According to Mr. Ray, "On a daily production basis the Abbott Furnace is 300% more efficient than the previous furnace. We really appreciate the Abbott Team's knowledge and attention to detail in the design engineering and manufacture of a specialized furnace."

Abbott Furnace is an industrial furnace manufacturer with 35 years of experience designing and producing some of the industry's most reliable and



high performing industrial continuous process furnaces. Abbott is a leading producer of industrial sintering furnaces, annealing furnaces, tempering furnaces, brazing furnaces, heat treat furnaces, steam treat furnaces, industrial

ovens, CAB furnaces, High-Temperature Furnaces and other specialty furnace products. Abbott Furnace is a privately owned company located in St. Marys, Pennsylvania. Abbott furnaces are proudly manufactured in the USA.



Elk County Heat Treat Fire-The Cause

Aug 6, 2020

Generally when we hear about a fire in the heat treating industry we do not hear about the cause. In the case of the recent fire in St. Marys, PA we do know what the cause is and it is right in line with what we previously reported;

The owner of a St. Marys heat treating plant recently reached out to The Daily Press in an effort to clarify the cause of a fire which occurred at the facility on Thursday afternoon. Ben Vrobel, owner of Elk County Heat Treaters, explained a contractor working inside the building accidentally drilled into a line which carries oil from the quench tank to the oil cooling station. This caused the oil to spray out, with the spray catching a pilot light on the furnace thus igniting the fire. The spray reached the roof and in turn burned off the rubber roof.



"The interior damage was minimal compared to the exterior, effectively burning the roof off the building," Vrobel said. Vrobel was quick to credit the prompt response and hard work of local firefighters. "The firefighters did an outstanding job. They were exceptional and I am proud to have them in our community," he stated. Vrobel, who has owned the business since 2014, noted the professionalism shown by the firefighters and specifically how they helped protect some of the company's product thus saving many people's jobs.

CFC fixtures –Quality Fixturing For Vacuum Heat Treating

Aug 6, 2020

Written by Rolf Terjung. Furnace fixturing made of CFC (carbon fibre reinforced carbon) are the state-of-the-art standard in vacuum heat treating these days. A significant quality feature of the vacuum heat treating process is the shape and dimensional stability of heat treated components. This article focuses on the impact of CFC fixtures and how they help to reduce the distortion of case hardened parts in Low Pressure Carburizing (LPC) applications with High Pressure Gas Quenching (HPGQ). These results provide evidence that distortion of heat treated components can be minimized and controlled by the use of individually designed fixtures made of CFC material. In various studies [1], the vacuum heat treatment technology known as low pressure carburising (LPC) followed by high pressure gas quenching (HPGQ) for case hardening components has shown that shape and dimensional changes in heat treated components can now be controlled to the extent that the subsequent hard machining steps can be reduced or even eliminated entirely. This is a key factor in reducing throughput times and the costs of component manufacture. The advantages of the method [2] can be used in particular for large surface gear parts requiring complex machining. Due to the high quality requirements (shape and dimensional tolerances, hardness parameters), case hardening using LPC and HPGQ technology was selected for the internal ring gear that will be used in the manufacture of a new 6 speed automatic transmission. The tests were performed in a ModulTherm system (ModulTherm is a brandname of ALD Vacuum Technologies GmbH).

METAL VERSUS CFC FIXTURE Due to the component geometry and small cross-section, shape and dimensional changes are to be expected in the ring gear. In an optimisation process, the furnace manufacturer and the customer defined the heat treatment parameters in order to minimise heat treat distortion [1]. Heat treatment cannot influence distortions caused by residual stress released during the production chain, ranging from the metal and the blank to the soft machining of the internal ring gear. Full furnace loads comprising multi-layer (3D batch) batches (Fig. 1) are heated to the treatment temperature by convection (N₂) and vacuum. In order to achieve a penetration depth of 0.3 – 0.5 mm, carburisation using acetylene took place in vacuum at approx. 900 °C. The workpieces were then cooled to the austenising temperature and quenched with helium [1]. Extensive preliminary experiments had shown that the distortion results were better for helium than for nitrogen although, due to its relatively high carbon content and the small component cross-section, steel grade AISI 5130 would be suitable for nitrogen. The process cycle is described in [2]. High alloy metal and CFC fixtures

(graphite fixturing) were used. The distortion criterion is the lead average variation and the concentricity deviation. Distortion was investigated in 15 parts that were positioned at various points in a charging level and that were taken from different layers. The results of the dimensional lead changes are shown in Fig. 2. Fig. 2 illustrates the mean values and the scatter of the lead average after heat treatment with different parameters with reference to the untreated “green” values. After charging on a metal fixture with standard gas quenching, the average value increases compared with the “green” state, however, scatter increases significantly and exceeds the lower and upper limit of the specification. When changing to the CFC fixture, scatter falls significantly by 50 %. If the quenching process is also optimised by means of gas pressure and/or gas speed (dynamic quenching) while retaining the CFC fixture, the average values can be reduced and scatter confined so that it lies within the specification [1]. In addition, studies have shown that the distortion of the parts was independent of their position on the fixture level and layer. The heat treatment process became ready for series production in June 2006. Since autumn 2008, distortion values have only been checked on a random basis. As a result of continuous optimisations to the quenching process and CFC fixtures, these ring gears are today fitted straight into the transmission without hard machining.



Fig. 1: Fully loaded CFC fixture with internal ring gears, 10-layers (3-dimensional), 120 parts (1)

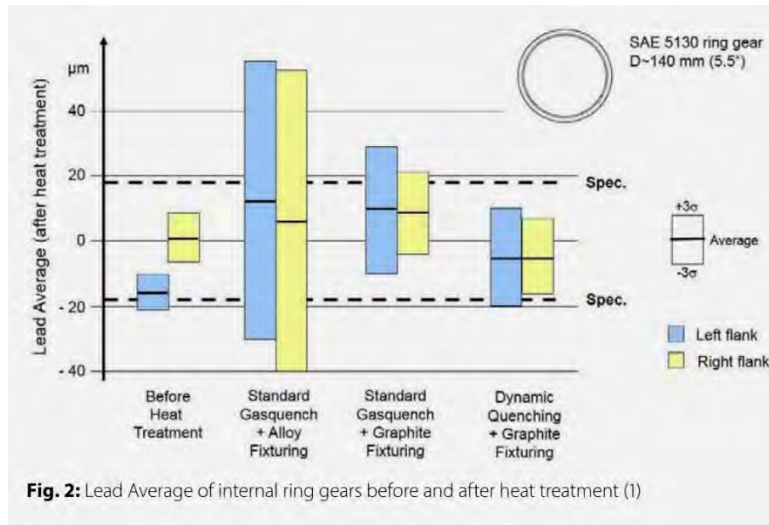


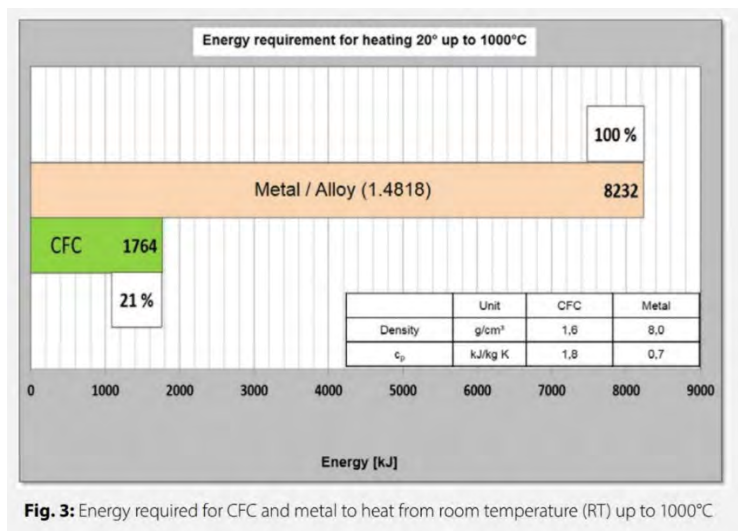
Fig. 2: Lead Average of internal ring gears before and after heat treatment (1)

INFLUENCE OF CFC MATERIAL PROPERTIES ON SHAPE AND DIMENSIONAL CHANGES

The reduction in scatter for both distortion criteria when switching from metal to CFC is notable. Due to the higher strength and lower density, the weight of the CFC fixture is only about 10 % of the comparable metal system with the same load bearing capacity. For the quenching process, the lower fixture mass means quicker and more uniform cooling. The lean design reduces the component's contact areas and support points and minimises shadow effects during carburisation. At the same time, due to the reduced surface resistance (cW value), the flow-through of the cooling gas increases. At junction points and other thickenings of the material, no significant residual heat is stored that can be returned to the workpieces. Due to the reduced, "non-value-adding mass" of the fixture material, distortions (heat induced stress) are minimised even during the convective heating phase (1). Components are heated more uniformly and quickly. A CFC workpiece fixture only consumes about 20 % of the energy compared with an equivalent metal frame (Fig. 3). Taking into account the expansion coefficients of the two materials at 1.000 °C (CFC: $1 \cdot 10^{-6}/\text{K}$, metal: $12 \cdot 10^{-6}/\text{K}$), the CFC fixtures retain their shape. Deformations of the workpiece fixture, which are transferred directly to the components, can be disregarded. An extensive presentation of the CFC material properties and how they can be used for CFC workpiece carriers is described in (4). Some of the key material properties that make CFC suitable for vacuum heat treatment are given below:

- Low density ranging from 1.3 up to 1.7 g/cm³
- Increasing flexural strength with raising temperature (1.000 °C +15 %; 2.000 °C +30 %)

- Very high thermal shock resistance: $R \approx 1.000 \text{ }^{\circ}\text{C}$
- No changes in dimensional stability (CTE for CFC-Fixtures approx. $1 \cdot 10^{-6}/\text{K}$)



WORKPIECE FIXTURE DESIGN REDUCES COMPONENT DISTORTION

Example 1: Input shaft In recent years, the continual demand for high precision components with minimum distortion and reduced manufacturing costs has led to an optimisation of the plant technology for low pressure carburising with high pressure gas quenching. Directly integrating heat treatment in the soft and hard machining production line has reduced the throughput times of the parts and so made the manufacturing process both more effective and more economical. The target of integration is the so-called one piece flow [5]. The workpieces are now only charged in a single layer (2-dimensional) and synchronised with the up- and downstream process [3]. The components are heated and quenched more quickly and uniformly than 3-dimensional batches. The mass of the workpiece fixture is greatly reduced so the thermal energy can be transferred directly to the components. During cooling, the cooling gas flows past the component in such a way that the heat is extracted directly and uniformly. This enables part-specific heat treatment that, on the one hand, leads to a reduction in the process time and, on the other hand, to an increase in quality in the form of reduced shape and dimensional changes [5]. In order to make best possible use of the advantages of the technology, a CFC fixture was used and fully loaded with 30 shafts. The distortion criteria were axial runout and concentricity for carburising temperatures 960 °C, 1.000 °C and 1.050 °C. In order to obtain the smallest possible distortions, two different ways of part orientation were tested: hanging and standing. The distortion results for axial runout, as the critical dimensional deviation for use of the shafts, are summarised in Fig. 4. The maximum values, the average deviation

and the standard deviation are shown. The best results are obtained with “standing” positioning and the specification of 40µm met for all three treatment temperatures. This example also shows how, due to the low fixture mass and good flow properties, the CFC workpiece fixture supports the low standard deviation values [6] and so makes a considerable contribution to process reliability. The common element in the studies to reduce form and dimensional changes as cited in this article is that both a quick and uniform heat supply and the targeted flow of the cooling gas to the components are essential for minimum component distortion. In addition to the structural design of the quench chamber, the way in which components are loaded in the CFC fixture is extremely important. When the “standing” batch loading of this input shaft had been found to be optimum, the workpiece fixture was modified in accordance with the following design criteria:

- Cross-section of component (bulkiness)
- Distortion criteria
- Contact areas component – fixture (shadow)
- Gas flow (heat transfer)
- Loading density (efficiency)
- Carrying capacity (Load)
- Positioning accuracy
- Loading (automated, manual)
- Process temperature (contact reaction: eutectic)

The result is shown in Fig. 5. In series production, loading of the components and also batch loading in the treatment chamber are performed automatically by a robot. Example 2: Thin-walled ring The thin walled ring was case hardened in vacuum on a single layer CFC fixture. The circularity achieved was insufficient for series production. The component was repositioned using a fixture that had been optimised for the ring, taking account of defined criteria (Fig. 6). 700 rings from different batches were measured and evaluated after heat treatment on the optimised fixture. The results of the circularity deviations are summarised in Fig. 7. With part-specific fixture design, it was possible to reduce the maximum circularity deviation by 25 % to 0.3 mm and the average deviation by 50 % to 0.12 mm. The deviation values measured for the 700 parts were within the lower (UG) and upper limit (OG). No rings were rejected. The new fixture design was released for series production and implemented as a new standard.

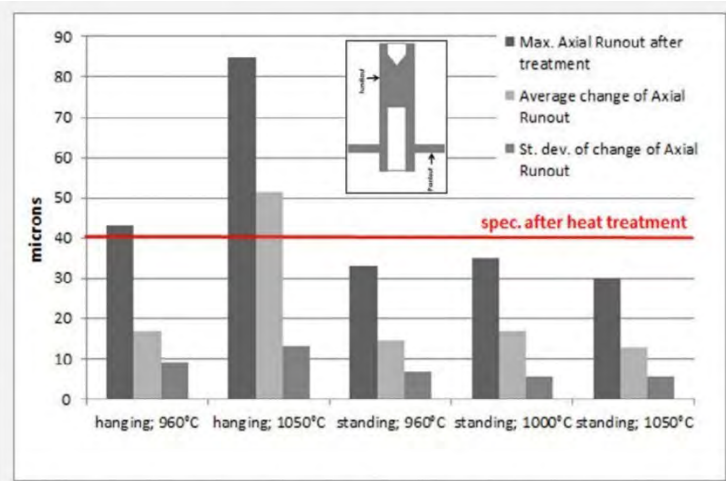


Fig. 4: Axial runout of the input shafts after case hardening for various test conditions (6)

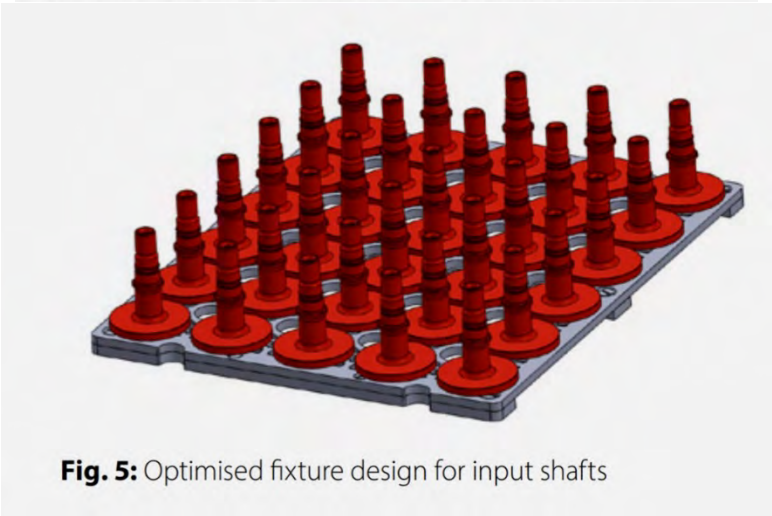


Fig. 5: Optimised fixture design for input shafts

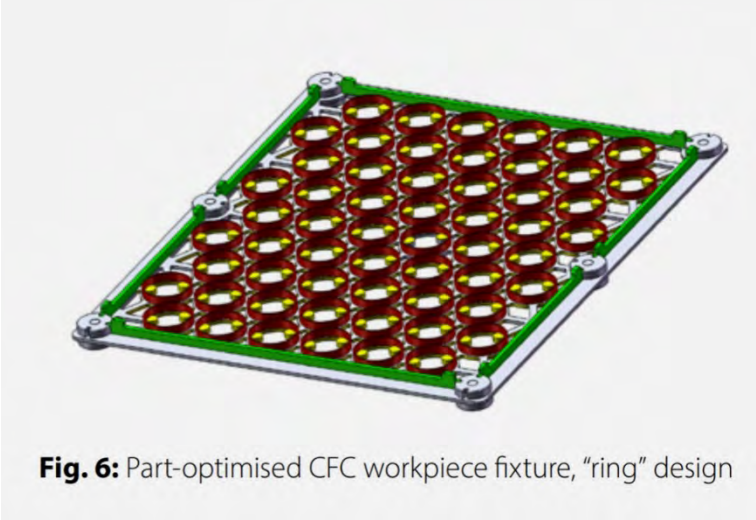


Fig. 6: Part-optimised CFC workpiece fixture, "ring" design

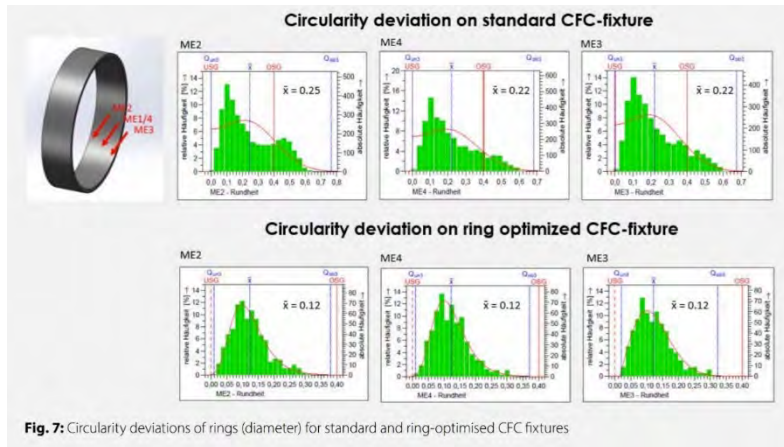


Fig. 7: Circularity deviations of rings (diameter) for standard and ring-optimised CFC fixtures

SUMMARY

Controlling heat treat distortion is of key importance in order to reduce production costs for complex components, e.g. in gear manufacture. Heat treat distortion of gear components with a high amount of machining and thin-walled cross sections can be controlled by low pressure carburising combined with high pressure gas quenching. By using CFC workpiece fixtures together with various process variants (e.g. dynamic quenching), shape and dimensional changes can be reduced to such an extent that, in individual cases, hard machining can be eliminated completely. The standard deviation of the average distortion values, as an indicator for controllable, reproducible shape deviations, is supported significantly by CFC fixtures. The further refinement of the method from 3D to 2D loading shows how process innovations and part specific CFC workpiece fixtures can lead to a further reduction in distortion. Process reliability is increased and production costs are reduced. Micro-alloyed steels have recently been developed that prevent grain growth even at high carburising temperatures of up to 1.050 °C. This development is only possible on CFC fixtures that ensure uniform workpiece heating and cooling.



Solar Atmospheres Builds a Future for Vacuum Oil Quenching

Aug 5, 2020

“The novel coronavirus (COVID-19) pandemic has impacted every industry and business across the globe. Solar Atmospheres of Western PA (SAWPA) is no exception. “We have had to think on our feet, find innovative solutions and pivot quickly, to change protocols to protect our employees and to safeguard our business” states Bob Hill, President of SAWPA. “At first, it seemed almost necessary to pause our business, take time to figure out every minute detail to play it safe. However, that philosophy was not how we built this business after the 2001 recession, nor would that have supported our employees, their families and our customers today” responded Hill.

Solar views this period as a way to set new paths of transformation and growth for the company. We have encouraged the adoption of the newest technology, such as Vacuum Oil Quenching (VOQ). The latest VOQ quench line, including a hardening furnace, tempers, washer, and charge car, will be installed and fully operational by the end of 2020. To make room for this brand-new innovation, SAWPA continues to progress in the construction of its 15,000 square foot addition. Solar could not be more excited for this expansion. This is a time for all business to look at strategic ventures and new diversified offerings with a new lens to better serve this ever-changing environment.

For additional information about Solar Atmospheres of Western PA, contact Bob Hill at 866.982.0660, ext. 2224, or bob@solaratm.com, and visit www.solaratm.com.





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Bodycote Changes

Aug 5, 2020



We understand there has been a change at the top level in Bodycote North America. Bill Sandstrom had been Vice President of Operations, AGI NAA until he recently parted ways with the company. Our understanding is the Mike Boyle will be taking over this position. Mike is a good man who we have met a couple of times over the years. Bodycote needs no introduction when it comes to commercial heat treating but we will still mention that it is the largest commercial heat treater in the world.

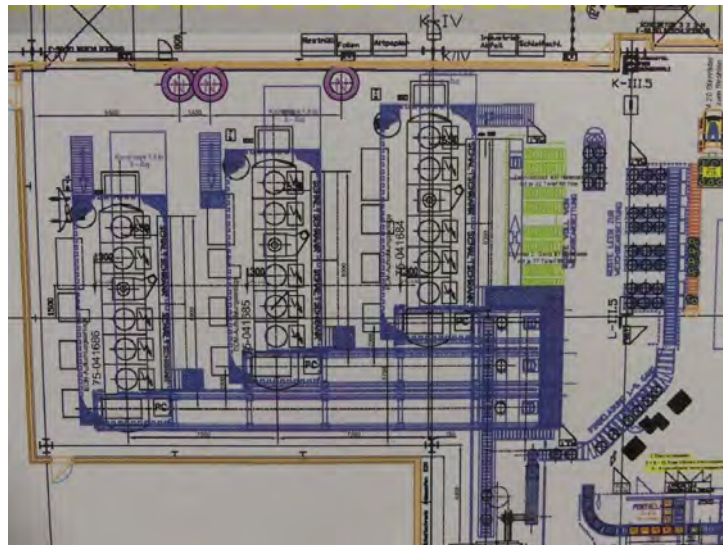




Tuesday Morning Briefing

Aug 4, 2020

Today we start off in **Vienna, Austria** where we see that August 5th car manufacturer **Opel** will be auctioning off equipment related to gear box manufacturing. This includes a very large **ECM Vacuum Carburizing System** built in 1997. This is the older style ECM design and features 3 systems each consisting of 5 vertical carburizing chambers located off of a central transfer chamber, opening bid is €125,000. When built these were great systems, and worked perfectly however by today's standards capacity is very much on the small size and our prediction is that the equipment will probably end up being scrapped.



Speaking of auctions we see **Western Forge** in Colorado Springs, Colorado, USA will be auctioning off some equipment Monday, August 17 & Tuesday, August 18. The auction includes the heat treat department which features a small AFC mesh belt furnace line.



Everybody in the industry knows **Eclipse** combustion burners, well it appears they will be moving from their Rockford, Illinois location; "Honeywell has decided to close its Rockford Eclipse site by 1Q 2021 and is planning to move the work to our Muncie, Indiana, facility. This will be done in phases. We're encouraging affected employees to apply for other roles within the company and eligible employees will be offered severance and outplacement assistance." Another plant in Rockford which is actually closing this week is **Greenlee Tool**. The company has this to say; "This difficult decision is no reflection on the quality of our employees at the Greenlee facility, who have served our customers and the company well over the years. This is a business decision based on global competition and Emerson's review of operations to manage costs, be competitive, and provide the best possible service to our customers. The Rockford factory manufactures hole-making and punch tools used by electricians, plumbers and others in construction. The Rockford plant closing is expected to be completed by August 2020, affecting 65 employees. The company will move volume to its existing Elyria, Ohio, facility and outsource some of the other products produced at the local facility, 1222 Research Parkway." We mention them today as they have an older in house heat treating department which is part of the closure.

We regret to mention the passing of long time heat treater **Wayne Welton**. Wayne spent most of his working life with commercial heat treater **HTI** in Indiana, USA. "Wayne A. Welton II, age 57, of Logansport, passed away unexpectedly on July 28, 2020, at his home. Born Oct. 4, 1962, in Mount Carmel, Illinois, he was the son of the late Wayne A. and Beverly "Diane" (Lowe) Welton. On Feb. 28, 1992, in Las Vegas, Nevada, he was married to Pam (Smith) Welton. Wayne was a 1981 graduate of Pioneer High School. For over 30 years, Wayne worked as a lead man for HTI Heat Treat Specialists in Logansport. He spent a lot of time at work and was a very dedicated team member. Wayne enjoyed gardening, especially when it came to growing different varieties of peppers. Most of all, he loved spending time with his grandchildren."

In Burlington, Ontario, Canada we recently announced how **Burloak Technologies** was in the process of setting up a very impressive in house heat treating department. We can also add that the company will be installing this year a brand new Hot Isostatic Press system. "Burloak is expanding our post-processing capabilities to include comprehensive in-house heat treatments with Hot Isostatic Pressing (Hip)." In Sterling Heights, Michigan, USA **Cyprium** Induction is expanding their R & D capabilities with the addition of a used dual spindle induction scanner. Cyprium provides induction systems and tooling. In Buckinghamshire, UK commercial heat treater **Titanium Heat Treatment Services** is adding equipment as you can see in this photo. We have always been fascinated with this place as it is the only commercial heat treater we have ever run across that almost exclusively heat treats parts for Formula 1 race cars.



*And for something different we are going to leave you with these photos of a heat treat firm in **Lima, Peru** by the name of **Tratar** that we visited a couple of years back.*



Canadian Civic Day Holiday

Aug 3, 2020

Canadian Civic Day Holiday

Due to the Canadian Civic Day Holiday the offices of WG Montgomery Ltd., will be closed Monday, August, August 3, 2020. Regular news updates will resume Tuesday, August 4th.

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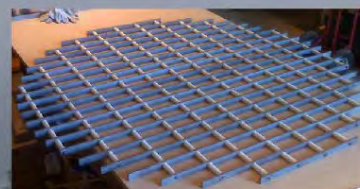
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