

METAL MINUTES

SECO/WARWICK'S NEWSLETTER

YEAR IN THE CAPTURE
SECO/WARWICK GROUP
IN 2020 

HARDENING PLANT SOLUTIONS
JOIN FORCES TO DEVELOP

SUPERIQ®
GAS CARBURIZING FURNACE DEPLOYED
IN AMERICA

CSR by SECO/WARWICK

REMOTE FACTORY ACCEPTANCE TESTS
THE NEW REALITY

PIT- LPC MODERN ALTERNATIVE
FOR ATMOSPHERE FURNACES

We share our experience and knowledge with you

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STRONG YEAR (2020)

- FOR SECO/VACUUM

Aerospace and defense sectors lead the surge in new equipment orders for SECO/VACUUM (SVT), a SECO/WARWICK Group Company, with the tool and die market in a strong supporting role.

In stark contrast to a generally cautious economy upset by a global pandemic, farsighted OEMs have their horizons set well into the future as they develop plans for ground-breaking transportation technologies. One example is the purchase by a major aerospace contractor of SECO/VACUUM's single-piece flow continuous vacuum furnace, UCM® 4D Quench®, to become an integral part of a demonstration plant dedicated to completely automated gear manufacturing. The pilot plant will prove that the company will meet the high quality, high volume demands of their national and international defense customers in the years to come.

UNICASE MASTER® 4D QUENCH® – THE NEW STANDARD FOR AUTOMATION

SECO/WARWICK's groundbreaking UCM® 4D Quench® is a revolutionary, vacuum heat treatment system that provides continuous single-piece workflow for case hardening of gears and rings by low-pressure carburizing and high-pressure gas quenching in 4 dimensions including rotation. Contrary to the traditional, batch mode of heat

treatment, every single part goes through the system the same way in terms of position, timing and process parameters. With a part exiting the system at a rate as short as 30 seconds each, customers can experience throughput as high as 1 million perfectly uniform parts per year. Such technologies are also part of the fabric of today's industry-leading discussions: A presentation by SVT's Tom Hart and noted heat treat authority, Dan Herring, during SECO/WARWICK's E-Seminar in September addressed the future of continuous vacuum furnace technologies as enabling these disruptive industry applications. A transcript of this discussion appears in the January 2021 issue of Industrial Heating magazine.

VECTOR® – TOP VACUUM TECHNOLOGY IN AMERICA

In April, SECO/VACUUM sold a single chamber vacuum furnace for an aerospace application involving the heat treatment of exotic electrical steels. While SECO/WARWICK Group has been supplying Vector furnaces to this international aerospace manufacturer in Europe and Asia for many years, this was the first furnace intended for a plant located in the US. Vector is used in multiple applications within the aerospace sector, including many of the most critical processes, such as heat treating turbine blades and landing gear. Delivered AMS2750 specification ready, Vector is also in wide use in the aerospace aftermarket to maintain fleets of aircraft.



DEFENSE INDUSTRY BENEFITS

- FROM CUSTOMIZATION

Defense made headlines as well in 2020 with other Vector orders, the company's most popular product, a highly versatile vacuum furnace that can perform a wide variety of heat treatment processes. In fact, 2020 started with orders for 4 Vector vacuum furnaces in the first two months of the year. Defense contractors appreciate Vector's flexibility, as in the case of a custom furnace designed to accomplish any heat treatment process equally well as any of the company's other specialty furnaces in the plant, providing added capacity while also serving as redundant back-up in the event another critical furnace is unavailable. In addition to aerospace and defense applications, Vector was a valued asset at aluminium extrusion dies manufacturing plants, including Youngstown Tool & Die, who

purchased two Vectors in 2020, one from SVT's VIP quick-ship program and one for a later delivery.

WATCH THE VIDEO:

See SECO/WARWICK year in the capture. Click.



What vacuum technologies dominated the metal heat treatment in 2020? You don't need to guess. Click below.



PIOTR ZAWISTOWSKI
SVT MANAGING DIRECTOR

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I believe SECO/VACUUM has been awarded much of this business because we proved time and again that we can pivot quickly to meet customized solutions on deadline while also delivering the most reliable technologies on the market. Of course, our professional support team is another reason.

A growing staff of sales engineers and aftermarket specialists means our customers are never stranded for support."

"All in all, 2020 was a very satisfying year for SECO/VACUUM in an otherwise unpredictable global economy" noted SVT's Managing Director, Piotr Zawistowski.



I. HARDENING PLANT SOLUTIONS

- COMMERCIAL HEAT TREATERS CHOOSE TECHNOLOGIES

For the past decade, SECO/WARWICK together with the HART-TECH hardening plant has been working together to engage in the evolving science of modern metal heat treatment solutions.

From the beginning, the cooperation between SECO/WARWICK and the hardening plant involved science and business contacts. Together with professor Piotr Kula's team from the Faculty of Mechanical Engineering at the Łódź University of Technology, the company implemented projects and research, and collaborated on the technical capabilities of equipment in terms of the latest research and innovations in the discipline. As this work progressed, the cooperation started to involve product development through equipment testing in practical business applications.

In 2009, the initiative of three researchers from the Institute of Materials Science and Engineering of the Łódź University of Technology – professor Piotr Kula, professor Antoni Rzepkowski and Robert Pietrasik, Sc.D. Eng. – brought to life the HART-TECH hardening plant, which currently holds 11 specialized devices for vacuum metal treatment, all of the equipment supplied by SECO/WARWICK.

HART-TECH specializes in hardening, carburizing, nitriding, sulfonitriding and steel tempering processes, solution heat treatment and ageing, annealing, vacuum brazing, and case hardening of machinery and tool components. This state-of-the-art hardening plant makes perfect use of the latest technologies and based on knowledge and expertise modifies, changes and improves the products. Therefore, SECO/WARWICK solutions benefit from this dialogue, and the result is that their equipment is built to meet the exact needs of the customer.



CASE STUDY

For the past decade, SECO/WARWICK together with the HART-TECH hardening plant have been working together to engage in the evolving science of modern metal heat treatment solutions.

- SECO/WARWICK – one of the 5 largest global manufacturers of metal heat treatment equipment and technologies.
- HART-TECH – a hardening plant representing the highest quality standards, known to their clients as the company willing to take on the seemingly impossible projects. All its shareholders are scholars – professors, doctors of science, process engineers.



Vacuum furnace for gas quenching and carburizing
15.0 VPT-40/50/48 IQ

"At that time, this process was our missing link. SECO/WARWICK proposed an economical, yet efficient solution. Soon after this order, we designed a modular line with Łódź University of Technology and SECO/WARWICK. This was a huge step in the development of HART-TECH."

R. Pietrasik

Sc.D., President of the Board of HART-TECH

THE VISION SHARED

BY SECO/WARWICK AND HART-TECH



Double chamber vacuum furnace for carburizing and oil quenching. Cme D9912

SECO/WARWICK and HART-TECH share the vision for seeking new implementations, better and more efficient technologies, high-quality processes and modifications that make the heat treatment process more efficient, allow optimisations, or even defining new technologies. SECO/WARWICK equipment is perfect not only for everyday and regular hardening operations, but also for trials, experiments and tests. The devices offer high precision, enable the control and monitoring of a given process, and their design provides for additional safety margins that make it impossible to exceed temperature, power and speed limits. The furnaces are also very versatile, enabling many processes with the use of one device. Commercial hardening plants especially value the versatility when serving many different customers from various industries and sectors.



SŁAWOMIR WOŹNIAK

CEO SECO/WARWICK

"On the one hand, HART-TECH is a particular partner with whom we have very close cooperation in terms of the technologies and processes. On the other hand, this customer is something of an extreme. They quickly switch from what the device was intended for to what more can be done with it."

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MACIEJ KORECKI

VICE PRESIDENT, BUSINESS
SEGMENT VACUUM HEAT TREATMENT
FURNACES

"Our partner, like ourselves, loves science, research and development. Their curiosity of the world motivates us to develop new innovations. We attentively listen to the feedback from our customers. This enables us to create tailor made solutions which always respond to the needs 100%. With HART-TECH, we share the passion and a huge, constant drive for excellence."

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COMMERCIAL HARDENING PLANT MACHINERY PORTFOLIO

- DEVELOPMENT WITH SECO/WARWICK

HART-TECH, as a commercial hardening plant, uses two flagship SECO/WARWICK products, both multi-chamber furnaces - CaseMaster Evolution® (CMe®) - and single chamber furnaces - Vector®. Both solutions are the most popular devices for vacuum heat treatment used by commercial hardening plants worldwide. The vacuum carburizing process, in which SECO/WARWICK is an expert, is the common denominator for both solutions.

HART-TECH was established in 2010, when a retort pit furnace for nitriding and sulfonitriding was the first device purchased from SECO/WARWICK. The second solution chosen by HART-TECH was a CaseMaster Evolution® (CMe®) furnace. This range of vacuum furnaces is dedicated for case hardening by low pressure carburizing and oil or gas quenching. The equipment is an alternative for atmospheric sealed quench furnaces, continuous lines and multi-chamber systems. Commercial hardening plants value this solution for its versatility and for its applications in various industries, such as aviation, automotive, machinery or bearing industries. This makes CMe furnaces perfect for commercial hardening plants which need to satisfy the many different needs of customers.

A tempering furnace was another solution, increasing the capacities of HART-TECH.



"At that time, this process was our missing link. SECO/WARWICK proposed an economical, yet efficient solution. Soon after this order, we designed a modular line with Łódź University of Technology and SECO/WARWICK. This was a huge step in the development of HART-TECH,"
added R. Pietrasik, Sc.D., Eng.

A modular line made it possible not only to implement gas and oil quenching, but also to perform many other innovative processes for HART-TECH customers.

www.secowarwick.com



CaseMaster Evolution® (CMe®)

- hardening by low pressure carburizing and oil or gas quenching,
- an alternative for atmospheric sealed quench furnaces, continuous lines and multi-chamber systems,
- perfect for commercial hardening plants.

Industries:

Read more about CMe: [link](#)

RECOMMENDED SOLUTION

- MINIMISE THE PROBLEM

Vector®

- for high-pressure gas quenching (10 bar) with nitrogen cooling,
- can be used for the majority of standard hardening, tempering, annealing, solution heat treating, brazing and sintering processes,
- Environmentally friendly with low emissions of process gases.

Industries:



Read more about Vectro: [link](#)



Vacuum furnace for gas quenching and carburizing O VPT-40/50/48

Customers from the tooling industry joined the hardening plant at a later stage of development. When it comes to production, hardening deformations are a serious problem for these customers. Therefore, HART-TECH was in need for a device enabling gas quenching to minimise the problem.

The company selected a single-chamber Vector® furnace for high-pressure gas quenching (10 bar) with nitrogen cooling. This is the flagship and most versatile SECO/WARWICK product. Vectors are operated by hundreds of customers in 70 countries. Vector furnaces can be used for the majority of standard hardening, tempering, annealing, solution heat treating, brazing and sintering processes. They can be optionally equipped with SECO/WARWICK's proprietary technologies: low pressure carburizing (FineCarb®) and prenitriding (PreNit®).

DYNAMIC EXPANSION

The dynamic expansion of HART-TECH motivated them to place an order for another Vector® furnace for high-pressure gas quenching (15 bar).

The last device ordered, perfectly summarizing the 10-year cooperation between HART-TECH and SECO/WARWICK, is another CaseMaster Evolution® (CMe) unit - a two-chamber, third-generation furnace for batch processing with oil cooling. It offers a significant advantage in shortening the production process and improving the quality targets.

PRECISE SOLUTIONS

- GUARANTEE BENEFITS

Both solutions - CME® and Vector® - bring the best operating performance and enable the heat treatment of many different materials. This is the key factor when selecting furnaces to be used in commercial hardening plants. Combined with low process costs, shorter cycles, higher output and precise control over the process, they make competitive carburizing a reality, made by SECO/WARWICK. Satisfaction with the results, along with the expertise and experience of SECO/WARWICK has resulted in the long-term cooperation between the companies, and now, translated into the purchase of another device. This time it is a CaseMaster Evolution with oil hardening.

The CMe - a highly-efficient furnace for vacuum carburizing - ensures exceptionally high carbon transfer efficiency thanks to the vacuum process. It provides perfect carbon penetration when carburizing even densely packed loads and parts of complex shapes or having plugged holes. No intercrystalline oxidation and perfect uniformity of carburized layer enable the production of high-quality parts.

VACUUM HEAT TREATMENT TECHNOLOGIES AND EQUIPMENT

Modern, precise, energy efficient and ecological vacuum heat treatment equipment with guaranteed technology. SECO/WARWICK's experience in developing these solutions dates back to the 70s of the twentieth century, when vacuum-based heat treatment technologies emerged in the aerospace, automotive, defense, metallurgical, medical, nuclear, and utility industries. Over the last 25 years, the company's dynamic development has delivered more than 800 complete installations in more than 50 countries, and many of the technologies delivered have become a challenge to traditional technologies.

/ Technologies:

annealing, solution heat treatment, brazing, sintering, gas and oil hardening (HPGQ), FineCarb® and PreNitLPC carburizing (LPC), nitriding and other special technological processes.

/ Unique features:

dynamic and efficient heating system, precise temperature control, excellent temperature distribution in the working space, efficient and uniform cooling, compact and modular design.

/ Industries:

aerospace, energy, defense, medical, machine, automotive, tool, hardening plants.

/ Parameters:

single-, double- and multi-chamber batch and bulk furnaces, in horizontal and vertical configuration, low-, medium- and high vacuum, radiant and convection heating, low- and high pressure (HPGQ) gas cooling in pressure up to 25 Bar or hardening in oil, full automation, computer control system. Compliance with world safety and quality assurance standards.

"Certainly, the expansion of our hardening plant has not been a conventional one. We need to remember that the developing market needs were a significant factor affecting the purchase of new devices by HART-TECH. Thanks to the cooperation with SECO/WARWICK, in the past 10 years we have managed to strongly expand the company. We started with one customer and furnaces rented from Łódź University of Technology on an hourly basis. Now, all our vacuum furnaces come from SECO/WARWICK — a global manufacturer of metal heat treatment equipment. More than 1300 customers and a technology partner are probably the best recommendation for us and for this partnership,"
summarised Robert Pietrasik, Sc.D., Eng. President of the Board of HART-TECH.

COOPERATION

- BETWEEN THE HARDENING PLANT AND THE INDUSTRIAL FURNACE SUPPLIER

Both companies push the limits. According to Sylwester Pawęta, Sc.D., Eng, Operations Director and shareholder of HART-TECH *"We are not interested in the intended purpose of the device but in what it can really do, what are its technological limits."*

According to M. Korecki *"HART-TECH expects to use our furnaces beyond its intended purpose, this is an obligation for us. But the partnership enables us to create and modify the architecture of devices, lines, systems and technologies for*

new applications expected by the commercial use of metal heat treatment equipment. Therefore, our partner is an inestimable source of information about SECO/WARWICK equipment. Continuous feedback from trials of equipment operated under the maximum load, used in an intensive way, shows us what we need to reinforce and improve to maintain the highest treatment parameters for the entire lifetime of the device, and also how we can upgrade them to work even better. Sometimes, this is a real trial by fire, or a test bench," summarised M. Korecki.

EXPERTS WITH EXPERTS

As the time passes, customers from various industries expect increasing reliability, performance and better results from heat treatment technology. Both commercial hardening plants, and ourselves as a design and manufacture company, face these expectations. This is the reason why HART-TECH uses Vector® and CME® vacuum furnaces from the SECO/WARWICK Group. Carburizing and gas and oil cooling in single- and multi-chamber furnaces guarantee the highest quality of heat treatment. The quality is guaranteed not only by state-of-the-art technology but

also by the competence of the partner - the scientists working at the Institute of Materials Science and Engineering at the Łódź University of Technology. HART-TECH itself is a modern hardening plant using advanced heat treatment and heat and chemical treatment technologies, operating equipment that enables optimum performance of processes according to the latest vacuum technologies. This is the direct result of more than ten years of cooperation between the two companies.



BOTH COMPANIES PUSH THE LIMITS

II. NEW GAS CARBURIZING IN AMERICA

- SUPER IQ DEPLOYMENT

THE AMERICAN REX HT WORKS ON PREMIERE SECO/WARWICK - SUPER IQ® TECHNOLOGY

The Super IQ® hybrid system, i.e. a conventional and vacuum furnace in one – the first commercial deployment. The solution to heat treatment problems was premiered in October at ASM 2019 in Detroit and now it operates for the first American customer.

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® the next generation 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.

A GAME-CHANGER FOR GAS CARBURIZING

SECO/WARWICK engineers envisioned Super IQ to change the market, because it is an affordable successor technology in batch harden and quench markets. The furnace takes decades proven technologies and integrates them into a single system for easy implementation with standard quench oils.

"Our alternative to the integrated hardening furnace - i.e. the Super IQ - was created in response to the needs of heat treatment companies. The industry required a safer, cleaner, faster and more effective carburizing method. Compared to traditional methods, Super IQ® provides many benefits, but especially productivity improvements. It works in higher temperature ranges, which translates into shorter cycles with no reduction in furnace life. As a result, it delivers more efficient production for less. This is a game changer the world over."

Piotr Zawistowski

Managing Director of SECO/VACUUM, SECO/WARWICK's subsidiary.

Attractive benefits of Super IQ

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.



"The Super IQ is a well thought out replacement to the traditional-gas-fired IQ furnaces. The technological advances allow us to run at higher temperatures, vacuum carburize, and clean harden with no decarburizing effects. The fact that our existing systems fit perfectly with this new addition helps to minimize the overall investment and accelerate successful integration. We expect the Super IQ to reduce operating costs, improve safety, and enable more environmentally friendly processing."

Johnathan Rex

General Manager at REX Heat Treat

HEAT TREAT PIONEERS

- STRETCH BOUNDARIES



Super IQ®

- No added production costs with improved quality and productivity compared to Sealed Quench carburizing
- Fits to any make Sealed Quench lines and their pits
- No ENDO generator needed, no flame
- Combines clean processing with exceptional performance of oil quenching
- Turn it on, turn it off – no idling nor conditioning

Advantages

- Potential to reduce treatment time thanks to the possibility of treating at higher temperatures (>925°C), thus increasing efficiency and reducing production costs
- Automatic creation of recipes, fully automated operation
- Flexibility – no work, no cost
- Easy integration with traditional units
- "Process versatility +" (also treatment of tools, higher process temperatures)
- Simple operation and attractive maintenance costs
- No open flames, smokiness, emissions
- Elimination of an additional device – the endo generator

Industries:



Heat treat pioneers stretch boundaries REX Heat Treat, with facilities in Lansdale and Bedford Pennsylvania and Anniston Alabama, has been operating continuously since 1938. Over three generations, it has developed a progress model based on the use of innovation to meet their customers' current and future needs. Because of this development strategy, REX can effectively serve clients in demanding industries such as aerospace or space industry.



"We chose to partner with SECO/WARWICK because of the company's innovative thinking and established position in the marketplace. The number of their projects, implementations, and scale of activities is truly impressive. What is also important to us is their commitment to continuous improvement based on client input. We were looking for a competitive advantage, and we got it. Super IQ from SECO/WARWICK, and their other furnaces we bought, are all first class," said Johnathan Rex.

Carburizing does not have to be ugly!

Listen to the webinar and learn about the better way for achieve high production carburizing and hardening: Clean carburizing. Clean parts. A clean building and work area. We understand that change is difficult, and that is why carburizing is still done the same, dirty way after well over 40 years! Now you can improve your profit-generating capabilities. [Click here.](#)



I. CORPORATE SOCIAL RESPONSIBILITY

- ACCORDING TO SECO/WARWICK

"A good company offers excellent products and services. A great company also offers excellent products and services but also strives to make the world a better place." - Philip Kotler

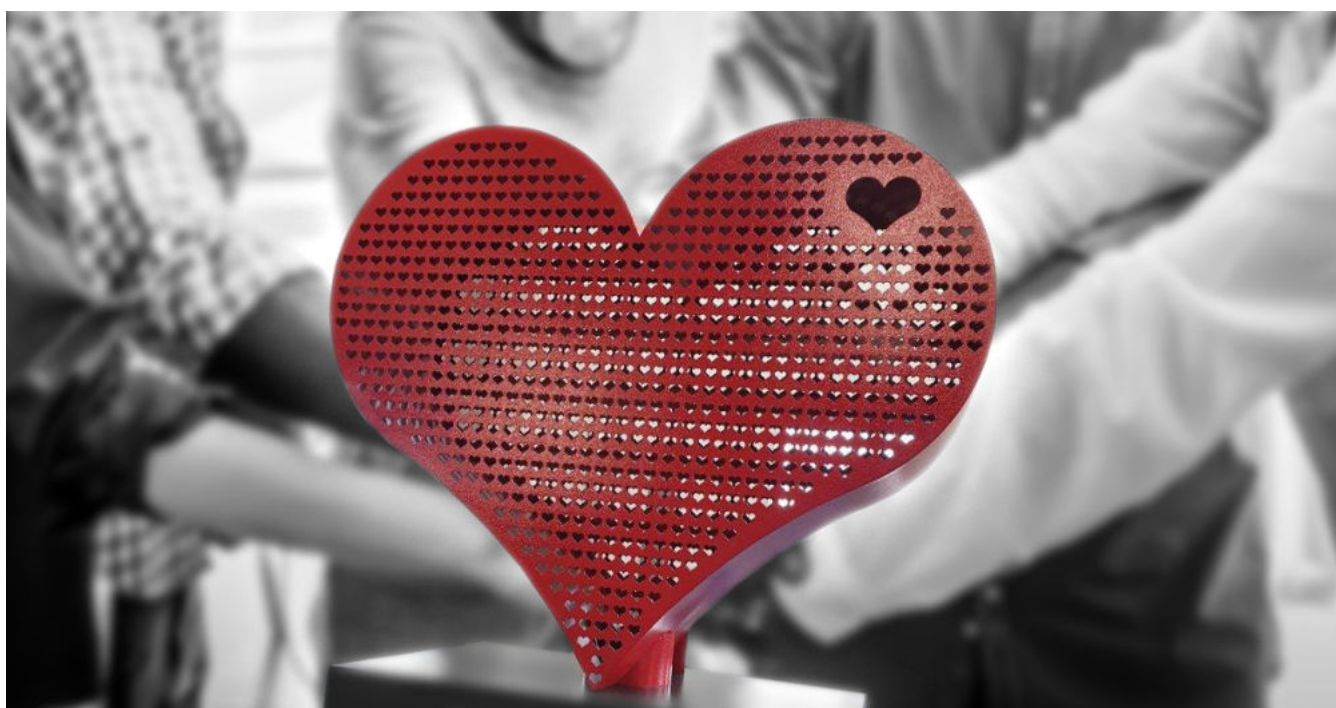
2020 was a particularly challenging year. The Covid-19 pandemic has significantly affected many industries, companies and families. This difficult situation led to neglecting, forgetting or abandoning multiple social initiatives. Still, as one of the five largest global companies manufacturing metal heat treatment furnaces, SECO/WARWICK has not forgotten about corporate social responsibility activities.

Social responsibility is a vital part of the business activity of SECO/WARWICK. The company is a family company. Not only because its owners still work there and their families are involved, but because for 30 years, we continue to employ subsequent generations of our employees. That is why family is the value on which our corporate social responsibility is based. SECO/WARWICK focuses on supporting the local community, the environment and safety. What social responsibility means for SECO/WARWICK, first and foremost, is acting for the benefit of its immediate environment.



SŁAWOMIR WOŹNIAK
CEO SECO/WARWICK

"Despite a difficult global economic situation, we did not forget about our social engagement. We have global operations, but our support is local. Our hearts beat where we come from and that is why we act locally".



A YEAR WHERE SOLIDARITY PREVAILED

- 2020

Solidarity and cooperation, hidden under the corporate PARTNERSHIP value, are inscribed in SECO/WARWICK's DNA. This experience of huge uncertainty and questions about the future have been common in the passing year.

SECO/WARWICK believes many positive changes, both business-wise and social-wise will originate from this extreme situation. Many examples of social solidarity which we can observe are the proof that more sustainable companies will emerge from this moment. This is clearly the era of responsible business.



KATARZYNA SAWKA
VP MARKETING, SECO/WARWICK GROUP

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"In 2020 we actively supported the hospital in Świebodzin which (similarly to other hospitals) faced the challenge of responding to the pandemic. We are glad we were able to help by purchasing the much-needed personal protective equipment and a patient monitor. This was SECO/WARWICK's contribution towards developing the health of the local community. We are also proud of the social engagement of our employees. They actively contributed to the popular campaign, the GaszynChallenge, to which we were invited by our partner. The Push-up Challenge, in which the Management Board was also involved, was a fun and generous way to make a significant contribution to save little Kajetan. The campaign combined safety and community - the two CSR values of the companies, and beautifully united us, the employees."

THE POWER OF SECO/WARWICK HAS MANY NAMES

In addition to social engagement, in 2020 we focused on pro-environmental activities. For the local community, we funded and built three SECO/HEARTS, a program to install metal containers for plastic screw caps. The initiative combines the idea of developing environmental sensitivity and awareness with the natural human desire to help those in need.

Collecting screw caps in the SECO/HEART is the flagship social campaign of the Świebodzin-based company. It not only helps to protect the natural environment, but the revenue is used to fund many various social initiatives. A ton of screw caps is worth as much as PLN 1000. This amount can cover as many as ten rehabilitation activities for the youngest in our community. By collecting screw caps, all of us show solidarity with those in need.

At this point, we should add that heavy industry is frequently associated with the threat to the natural environment. Yet, SECO/WARWICK strives to actively protect the environment. Not only through waste sorting, but also by involving their partners in the SECO/ECO idea.

"This year, we sponsored one of the largest international pro-environmental organizations with \$1 on every sold ticket to our on-line event. This enabled us to help with the involvement of our customers, partners and other stakeholders. SECO is ECO," concludes K. Sawka.

This year, for the first time ever, the Global Risks Report 2020 prepared for the World Economic Forum in Davos considered the environment protection issues to be the greatest potential threat to the world. The issues of environment protection were indicated by 750 global decision-makers as the key considerations to preserve global safety and order. The increase in social awareness of the progressing climate changes are also visible in Poland. We are facing the breaking point, and only socially responsible business can limit the impact of these changes.

II. REMOTE FACTORY ACCEPTANCE TESTS

- THE NEW REALITY

To meet this situation, SECO/WARWICK and Retech have recently implemented a comprehensive FAT (Factory Acceptance Test) remote program. The clients who have already taken advantage of these opportunities are companies from China, Mexico and South Korea.

The systems tested under the new program were furnaces for vacuum metallurgy using VIM technology (vacuum induction melting). In accordance with the SECO/WARWICK Group standard, this type of equipment is normally verified in the presence of the customer in the field by performing cold and hot tests.

"We are ready to carry out comprehensive tests of our furnaces prior to shipment. The technical infrastructure at hand enables the performance of hot tests covering most metals used in industry. The exception is titanium, which is a metal that reacts strongly with water and has special safety procedures, including the use of a technological bunker. We verify in practice all the operating parameters of the furnace and the associated peripheral devices, such as loading systems or closed cooling circuits, in full production cycles," confirms Jacek Trzpił, Deputy Director of Operations Vacuum Melting at SECO/WARWICK.

THE REALITY

The pandemic situation and the related need to ensure maximum compliance with the supplier-customer agreement by verifying the existing procedures and system performance has forced the use of new methods of operation. When travel is severely restricted and engineers work from home, remote acceptance testing of furnaces becomes a must.



IS FAT REMOTE A NEW STANDARD?

– TIME WILL TELL

The SECO/WARWICK Group has applied the experience, knowledge and solutions successfully used for several years in the field of monitoring and remote operation of its systems in real time mode. These technologies are widely known and used in various configurations, but it was rare, however, to engage them at the commissioning stage with the customer. The state of emergency in which production plants all over the world find themselves has forced the industry to ask these questions and to adapt them both on the part of the producer and the recipient. We need to be aware that the industrial vacuum metallurgy furnace is a technically advanced, complex device that is assessed through the prism of many aspects: technical, technological, safety, ergonomics, etc. In addition, there are industry and/or factory standards.

The first four tests for two Chinese customers and one each from Mexico and South Korea were carried out completely remotely with no customer engineers involved. Recordings from individual cameras, sensors and viewfinders were downloaded to secured servers and made available to customers. The tests were successful, and the adopted procedures guarantee the reliability and completeness of the data. In this respect, these methods can be successfully used for other customers.

TECHNOLOGICAL TESTS

"Remote acceptance testing is a highly requested service today. I could say that the financial rationale for such action has always existed, while the epidemiological threat has been the catalyst for change. It is a win-win action. Time-consuming and costly journeys can be avoided by maintaining a comprehensive testing procedure, supplementing reports with videos of activities and process flow, and the ability to analyze data online. For the first time, we did not send a team of engineers and technicians from the USA to Poland for testing. This is a huge time savings for specialists who could stay in their locations and successfully analyze test runs from remote offices or home," says Robert Szadkowski, VP Aftermarket at the SECO/WARWICK Group.

"Currently, there is no problem with setting up a fast, encrypted link, after which the customer, service technician or external auditor can fully participate in the research. This can be done in many different ways. We are supported in this by the IoT trend, and in our systems, the standard of equipment and network communication at the PLC and HMI & SCADA level. Rather, the bigger problem was the mental change of the process participants, who had to deviate from the usual patterns and procedures. Has it affected the quality of the reception? In no case. I think in a few years we will wonder why we didn't do it before, when it was technically possible," adds Szadkowski.

"Innovation is inscribed in the DNA of the SECO/WARWICK group, regardless of the area of operation. Customer service support, equipment and system diagnostics are pieces of a larger puzzle. The ultimate goal is the smooth, trouble-free operation of the equipment. At Retech, we create new technologies of vacuum metallurgy, and at the same time we adapt the innovations of other fields, including communication, both human and with devices, mobile access, control and diagnostics. SECO/WARWICK has great achievements in these areas. Remote commissioning of furnaces is the materialization of development activities," concludes Earl Good, Managing Director of Retech, a subsidiary of the SECO/WARWICK Group.

ABOUT TECHNOLOGICAL PROGRESS IN DEVICE ACCEPTANCE AND REMOTE TESTS

INTERVIEW WITH ROBERT SZADKOWSKI



ROBERT SZADKOWSKI

VICE PRESIDENT,
AFTERMARKET SEGMENT

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Are we ready for online testing?

We would first need to define what exactly we mean by remote testing. It should be taken into account that almost every furnace for heat treatment or vacuum metallurgy is a device designed and built from scratch and tailored to the specific needs of the customer. For this reason, the first testing in the hall, which is an integral part of the production process, verifying the correct assembly of mechanical parts and electrical installation should not be transferred to the scope of remote work. There is no logistical justification for such an idea. However, acceptance tests, and FAT in particular, yes. As long as we have knowledge and proven solutions in the field of data registration, sharing and reporting, it is a very practical option. Real-time tests consist of sharing streaming, online transmission from multiple cameras and sensors at once, and then supplementing the material with formal reports in accordance with the requirements of the standards and the contract itself.

Is it possible to commission a furnace at the customer's site without SECO/WARWICK engineers?

Yes, that is also possible. We do not have such experience yet, but in my opinion, it would be of great benefit to both parties. Let's remember that the delivery of a new furnace is a complex process in which the supplier and the recipient play important roles together, and success is the result of their cooperation. It starts at the stage of making arrangements regarding the expected technical and

technological parameters, continues throughout the production and commissioning period, and then during the warranty and post-warranty period. The participation of the customer, the end user of the furnace, in the acceptance tests is required, as is training of the operating personnel. So why could the commissioning of the furnace not be carried out by a customer with SECO/WARWICK remote support? There are exceptions to this when dealing with high-risk systems, but for many systems this would be perfectly acceptable. Again, I must conclude that this will be primarily a challenge to our ideas and internal acceptance, rather than to technical limitations.

Is Remote Testing an "Invention" because of the current travel restrictions?

As I mentioned earlier, such solutions existed and were ready for use at least a dozen years ago. The pandemic, on the other hand, caused a wave of inquiries from customers about the possibility of conducting such tests remotely, which resulted in the transition to their implementation. From a purely technical point of view, we at SECO/WARWICK have been successfully using these technologies for internal device supervision for at least 10 years. Remote access, and currently real-time data analytics in terms of predictive maintenance, is an area where we are constantly developing modern tools. In our work, we use remote supervision tools and applications, we report OEE indicators, and we conduct optimization processes in terms of batch queuing or energy factor consumption. We are also working on solutions in the field of service support and the use of SECO/LENS augmented reality. It is true that Covid 19 changed the rules of the game, but in this particular case, to the benefit of the industry.

[READ MORE ABOUT OUR SOLUTIONS: HERE](#)

SECO/TALKS

EXPERTS WITH EXPERTS



Where is heat treatment going to be in the next 20-30 years? Mr. Dan Herring, The Heat Treat Doctor®, predicts the future of heat treatment. See the interview held during last year's edition of SECOWARWICK e-Seminar 4.0 Heat Treatment and Metallurgy.

[CLICK AND WATCH THE VIDEO](#)



A good read in The Monty. The future of the heat treatment business in the eyes of Mark Hemsath, SECO/VACUUM specialist and who is among 30 Most Influential People. Technologies, predictions, challenges and more.

[CLICK AND READ INTERVIEW](#)

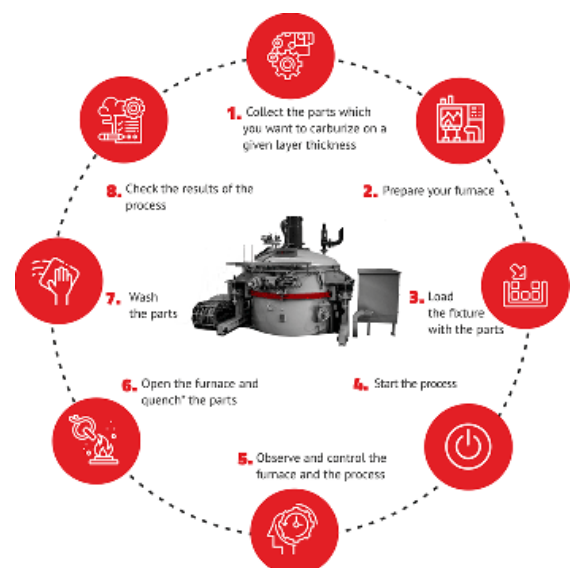
KNOWLEDGE IN A NUTSHELL

PIT-LPC - 21ST CENTURY LOW PRESSURE CARBURIZING (LPC) FOR LARGE CASE DEPTHS

3 in 1...sounds like a selling cliché. But if you take into consideration 1 industrial furnace instead of 3 that makes a huge difference.

Pit-LPC gives you the potential to replace 3 traditional, atmospheric furnaces. So let the new one set the trends & standards for quality, efficiency, durability, lifetime, speed. Win the market with SECOWARWICK's vacuum pit furnace while vacuum carburizing your massive parts like shafts, gears or cylinders.

[CLICK AND WATCH THE VIDEO](#)



PIT- LPC MODERN ALTERNATIVE

– TO ATMOSPHERE FURNACES

Effective and efficient carburizing, perfect process quality and a reduction of consumables and process costs - these are only a few of the advantages of the Pit-LPC and vacuum carburizing for thick layer applications. The Pit-LPC by SECO/WARWICK is a perfect solution for manufacturers carburizing bulky or long elements such as gears, bearings, and drill tools as well as other elements requiring thick carburized layers, since high process uniformity impacts the thickness of the carburized layer, and thus the quality of the workpiece.

The Pit-LPC system constitutes an alternative to gas carburizing, which has reached the maximum of its potential. This latest solution is both economical, through cost reduction, elimination of unnecessary media and an increase in production coupled with environmentally friendly operation, made possible by performing the process under vacuum in higher temperatures. Higher temperature means time, money and process savings up to 50%! The primary justification for this upgrade is that one Pit-LPC furnace can replace three atmosphere furnaces, which brings additional space savings.

The system is customized and adapted to the needs of the customer and their facilities, since the furnace can be installed in place of an existing atmosphere furnace.

Today, safety and ecology are particularly important. The Pit-LPC satisfies these two values thanks to low thermal emissions, no contamination, a pure process, minimum consumption of process gases and the absence of flammable and explosive atmosphere. That is why this solution belongs to the SECO/ECO portfolio.



SEE WHAT OTHERS DO NOT SEE

Win the market and gain the economic advantage:

- Lower your production and maintenance costs
- Save time and increase productivity
- Be environmentally friendly by shortening the process
- For all steels for carburizing



Pit-LPC: Vacuum Pit furnace for carburizing thick layers on large workpieces

Pit-LPC® ENSURES, AMONG OTHERS:

- / Efficient and effective carburizing
- / Time savings
- / Energy savings
- / Space savings
- / Higher safety of use

Pit-LPC meets the most stringent environmental standards

LOW PRESSURE CARBURIZING

- TRIPLE PRODUCTIVITY, LOWER COSTS

ADVANTAGES

- The highest quality and uniformity of the process
- Excellent quality of the surface
- No surface oxidation (IGO)
- Reduction of the necessary media to the minimum = savings
- Quick high-temperature process
- Minimum consumption of process gases
- Time savings as there is no need to prepare the process atmosphere
- Quick process initiation that does not require purging or atmosphere conditioning as in atmosphere furnaces
- Safety: No flammable or explosive atmosphere
- Low heat emission and no pollution (CO & CO₂)
- ECO friendly solution

PARAMETERS

CASE DEPTH - 4 MM WORKING ZONE:

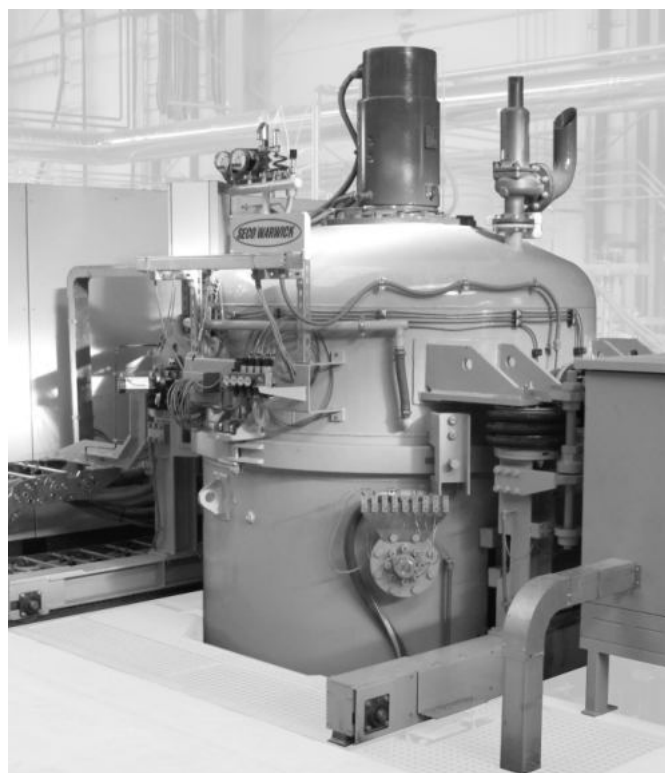
dia. 1800 x 3000 mm, dia. 45 x 75 inch, 8 ton

Carburizing temperature	950 C 980 C 1040 C
	1740 F 1800 F 1900 F

Process duration/ hour	70 h 50 h 30 h
	70 % 50 % 30 %

Process utilities cost	70% 55 % 45%
------------------------	------------------

Cost savings	> 200 K > 500K >1MLN
/EUR/DOL/per year	



Pit-LPC® Is the perfect solution for:

- Manufacturers carburizing massive and longitudinal elements such as gears, bearings, drilling tools and other elements requiring thick case depths
- Clients who want to reduce their costs through elimination of unnecessary media
- Companies who want to increase their productivity while respecting the highest environmental standards
- And those who want to increase their production capacity without purchasing additional equipment (1 Pit-LPC = 3 atmosphere furnaces), or save space by replacing three machines with one

We adapt the Pit-LPC furnace so that it can be installed in the old atmosphere furnace bay.

READ MORE about SECO/WARWICK solutions here: latest technologies

Industries:



TOP INDUSTRIES WITH TOP TECHNOLOGIES



February 23, 2021

SECO/WARWICK to build a 12-metre vertical retort furnace for the Karlsruhe Institute of Technology

The SECO/WARWICK vertical vacuum retort furnace for the Karlsruhe Institute of Technology (Germany) will be used for high-vacuum annealing of gyrotron components. The equipment will be used as part of the ITER project. This is the first time the SECO/WARWICK Group...

[READ MORE](#)



December 8, 2020

GEBERIT adds two unique SECO/WARWICK vacuum annealing furnaces

This is the first order for SECO/WARWICK from the European leader in sanitary products, GEBERIT. The two furnaces will be tailor-made according to customer requirements. The finished system is a hybrid model of the iconic Vector® vacuum annealing furnace. The two...

[READ MORE](#)



December 1, 2020

Another SECO/WARWICK Vector Vacuum Carburizing Furnace for ALP AVIATION in Turkey

ALP Aviation is increasing its production capacity and expanding process capability with the purchase of an additional Vector vacuum carburizing furnace from SECO/WARWICK. This purchase is the 4th installation for this client during 13 years of successful...

[READ MORE](#)



November 24, 2020

SECO/WARWICK Delivers the 7th furnace for the HTA Group in Australia

SECO/WARWICK will deliver the 7th furnace system to the HTA Group. The leading Commercial Heat Treater from Australia ordered a vacuum aluminum brazing furnace that will operate with a tight temperature tolerance of +/- 3 degrees C to meet the precision quality...

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November 7, 2020

ROTEC Purchases SECO/WARWICK High Vacuum Brazing Technology

ROTEC, Russia's first and only facility that manufactures welded honeycomb seals, has purchased a SECO/WARWICK vacuum furnace system that will enable ROTEK to expand the range and volume of manufactured products. Products can be processed without discoloration The...

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