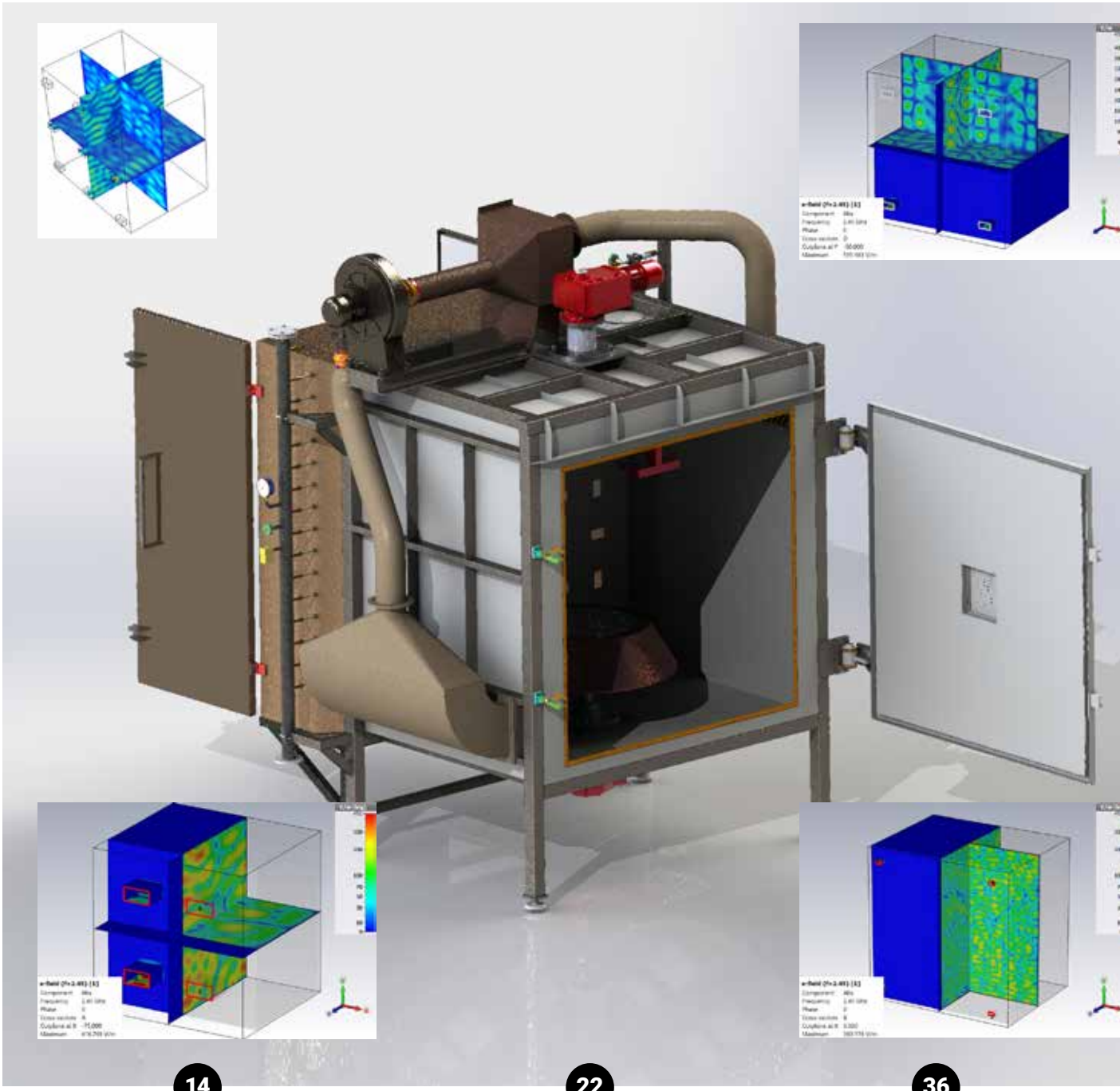
SISTEM TEKNIK ISSUE
JANUARY-FEBRUARY-MARCH 2021 ISSUE 3

INDUSTRIAL FURNACES

TECHNOLOGY NEWS



Industry 4.0 in Heat Treatment Industry

WE WISH FOR BEAUTIES IN EVERY FIELD OF OUR LIVES IN 2021

Dear readers,

We are here with the third issue of Furnace News. As Sistem Teknik, we are happy to convey our work and the successes we have achieved with our business partners firsthand through our magazine, and we aim to help you follow the sectoral developments. We share and reach it to you our esteemed readers, with great enthusiasm without losing our amateur spirit. We hope you are also enjoying our magazine.

We would like to highlight that your thoughts about our magazine are very precious to us... Your suggestions and demands will be our guides in carrying our magazine to a much better point. In this sense, I would like to remind you that we will be happy to hear and read all your suggestions and criticisms, and you can give feedback to our e-mail address below.

On this occasion, I would like to thank to Mr. Gokhan Lale who is the founder of our magazine, guest writers who have contributed with their articles, our business partners with whom we have interviewed by sparing time for us in their busy schedule, and our editorial team working with great effort.

We have said goodbye to the challenging year 2020 and said "hello" to 2021. As Sistem Teknik, we prepared a video attended by everyone in our company by entering the New Year, and asked spontaneous questions to our personnel. One of these questions was "Summarize 2020 in one word". T At that moment I could not find the exact and correct word in that moment, but when I thought afterwards I realized that the correct word was "Change". As you can imagine, a lot of things changed in 2020.

Our way of doing business, our social relations, our education system, our travel opportunities, our life. In short, everything changed.

Although this change had its own negatives, it also had many positive aspects. For example, we can use our time more effectively now. The office is not as important as it used to be in order to run our business. The concept of working hours is gradually disappearing. Everything is done online and much more practically.

Hoping that the Covid-19 epidemic will not be a problem in 2021 with the vaccine, I celebrate the new year of all my friends with my best wishes and wish it to be a healthy, happy and lucrative year.

Mehmet Özdeşlik
Sistem Teknik A.Ş.
Grup Yönetim Kurulu Başkanı
mehmetozdeslik@sistemteknik.com

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Grand Holder: **Mehmet Özdeşlik** - Editorial Office Manager: **Gökhan Lale**, Translation Editor: **Büşra Kulak** - Issue Time:Once Every Three Months - Issue Name: **INDUSTRIAL FURNACES TECHNOLOGY NEWS** - Publishing Place: **Kültür Sanat Basım Evi** - Litros Yolu 2. Matbaacılar Sitesi ZB7-ZB11 Topkapı / İstanbul Tel: 0 212 674 00 21 - Managament Center: **Sistem Teknik Sanayi Fırınları A.Ş. TOSB – Otomotiv Yan Sanayi İhtisas OSB 1. Cad. 15 Yol No: 1 - 41420 Çayırova / Kocaeli / TURKEY - Tel: +90 262 658 29 14 - Fax: +90 262 658 18 19**

LOW PRESSURE CARBURIZING AND HIGH PRESSURE GAS QUENCHING

Mehmet ÖZDEŞLİK - Levent SİNDEL - Selin KESKİN
Sistem Teknik Industrial Furnaces Inc.

This technical article reviews low pressure carburizing with acetylene and gas quenching technique on 16MnCr5 and 21NiCr5 to improve surface hardness. Carburizing process in vacuum furnaces can be carried out in a more environmentally friendly way compared as conventional heat treatment methods. Also, the benefits of low pressure carburizing and high pressure gas quenching are high quality, reliability for same charge, repeatability, less distortion and less intergranular oxidation. The experimental study is performed in single chamber of vacuum furnace resistant to 20 bar gas to minimize cycle time and cost, to maximize efficiency of hardenability. In this article, a complete heat treatment process for 16MnCr5 and 21NiCr5, with carburizing and quenching step involved, was proposed. The carburizing effects on the microstructure, carbon concentration, hardness profile and retained austenite were investigated. A good microstructure was obtained with martensite, less retained austenite and was oxide free. The case depth was approximately 0.70mm and the final surface hardness was 60HRC which meet the requirement of industry.

Figure 1 Vacuum Carburizing and High Pressure Gas Quenching

1. INTRODUCTION

Low pressure (vacuum) carburizing and high pressure gas quenching are modern surface hardening methods that are newly used in the heat treatment industry when compared to other traditional methods for sensitive and complex parts The greatest advantages compared with atmospheric processes are rapid kinetic reactions, and an oxygen free carburizing atmosphere. In addition, it has the advantages that include clean surface, small deformation, high mechanical strength and wear resistance. [1]The limitation of the gas quenching technology is the cooling rate.

This system can carry out carburizing heat treatment process with a temperature range of 250-1350°C

(523-1623 F), with a capacity 50kg/h at 5x10-2mbar vacuum. In addition, it can harden with gases such as Hydrogen, Nitrogen, Helium at 20bar pressure. Electrically operated Vacuum Carburizing and High Pressure Gas Quenching Furnace has a rectangular interior with 300x300x300 mm useful dimensions.

2. VACUUM CARBURIZING TECHNOLOGY

Vacuum carburizing a steel is typically a six-step process: (1)Furnace vacuum (2) Vacuum heating and soak step at carburizing temperature to ensure temperature uniformity throughout steel (3) Carburizing step to increase carbon content of austenite by giving carbon-rich hydrocarbon gas or gases (4) Diffusion step to provide gradual case/core transition. (5) Repeating carburizing-diffusion steps taking into account the furnace and material parameters to obtain a homogeneous carbon distribution. (6) Quenching step to harden the material. [2]

The carbon potential in the furnace depends on material, surface area and the carburizing gases. Carbon potential is also related to soot formation that affects the furnace performance and the material quality negatively. To minimize soot formation, carburizing step parameters and repeating steps should be optimum according to the material quality and cross-setion. When the carburizing-diffusion step completed, high speed cooling should be done to harden the surface. Thus, the harder and more strenght martensite phase is obtained from soft austenite phase.

3. PROCEDURE

3.1. Test Materials

In this study, vacuum carburizing and quenching processes were applied by using 16MnCr5 and 21NiCr5 structural steels, which are known to exhibit high hardness and strength in the heat treated surface, softness and softness in the core. Then, the results were analyzed metallurgically. The main chemical composition of test materials is shown in Table 1. The materials dimensions are 15x30x250mm3 and 15% of the furnace capacity is provided with five samples.

	C	Si	Mn	P max	S max	Cr	Mo	Ni
16MnCr5	0,18-0,23	0,20-0,35	0,70-0,90	0,04	0,04	0,40-0,60	0,15-0,25	0,40-0,70
21NiCr5	0,14-0,19	0,15-0,40	1,00-1,30	0,035	0,035	0,80-1,10	-	-

Table 1 Chemical Analysis of Test Materials

3.2. Test Procedure

The test materials are placed in a homogenous manner in the furnace and the furnace is heated to austenite temperature under vacuum. After obtaining homogeneity at this temperature value, carburization-diffusion steps was carried out by supplying carbon that is determined with mass flow measurement devices to harden the material surface. When the steps have been completed, the surface layer is hardened by fast cooling with nitrogen gas at high pressure to ensure the passage of the material to the martensite structure. Then, cryogenic treatment is applied to further improve wear resistance by reducing residual austenite.

To achieve the desired carbon thickness and surface hardness in the vacuum carburizing and high pressure gas quenching procedure, the furnace process recipe is established taking into consideration many parameters such as the carbon content at the beginning, the temperature, pressure and time of the carburizing steps, type of carburizing gas and the number of carburizing-diffusion steps. The recipe parameters used in this study are shown in Table 2. Before the heat treatment, NiCr-Ni thermocouples are attached to the materials to follow temperature for surface and core. To remove the risk of cracking due to heat up suddenlly, the furnace is heated with 10 °C/min ramp up. The carburisation temperature is 950 °C and the quenching temperature is 800-830 °C. (Figure 2)

In this study, acetylene, C2H2, which has high-carbon-concentration and dissolves quickly at the austenite temperature.[3] At the end of the vacuum carburizing, the furnace is cooled with 20 bar N_2. After vacuum carburization and high pressure gas quenching, the

Vacuum Value	5x10-2mbar
Carburizing Temperature	950 °C
Heating Ramp up	10 °C/min
Carburizing Gas	Asetilen, C2H2
Acetylene Flow Rate	4 lt/min
Carburizing and Diffusion Pressure	1 mbar
Total Carburizing Time	30 min
Total Diffusion Time	86 min
Cooling Gas and Pressure	20 bar N_2

Table 2 Recipe Parameters

cryogenic process (sub-zero) which is continuation of a heat treatment process that ends at room temperature is applied in the cyrogenic tank. The cryogenic treatment aim is to promotes the transfer of retained austenite to martensite on the workpiece. It is the reason why the cryogenic treatment can reduce the surface-retained austenite significantly. The decrease of the retained austenite led to a hardened surface. For this reason 16MnCr5 and 21NiCr5 steels were treated with Nitrogen at -140 °C for 3 hours, then the results is investigated.

4. RESULTS of EXPERIMENT

Vacuum carburizing is mostly controlled by experimental results instead of theories. Microstructures and hardness from the surface to the core and hardness are varied depending on case depth, temperature, furnace pressure, flow rate of hydrocarbons, and time.

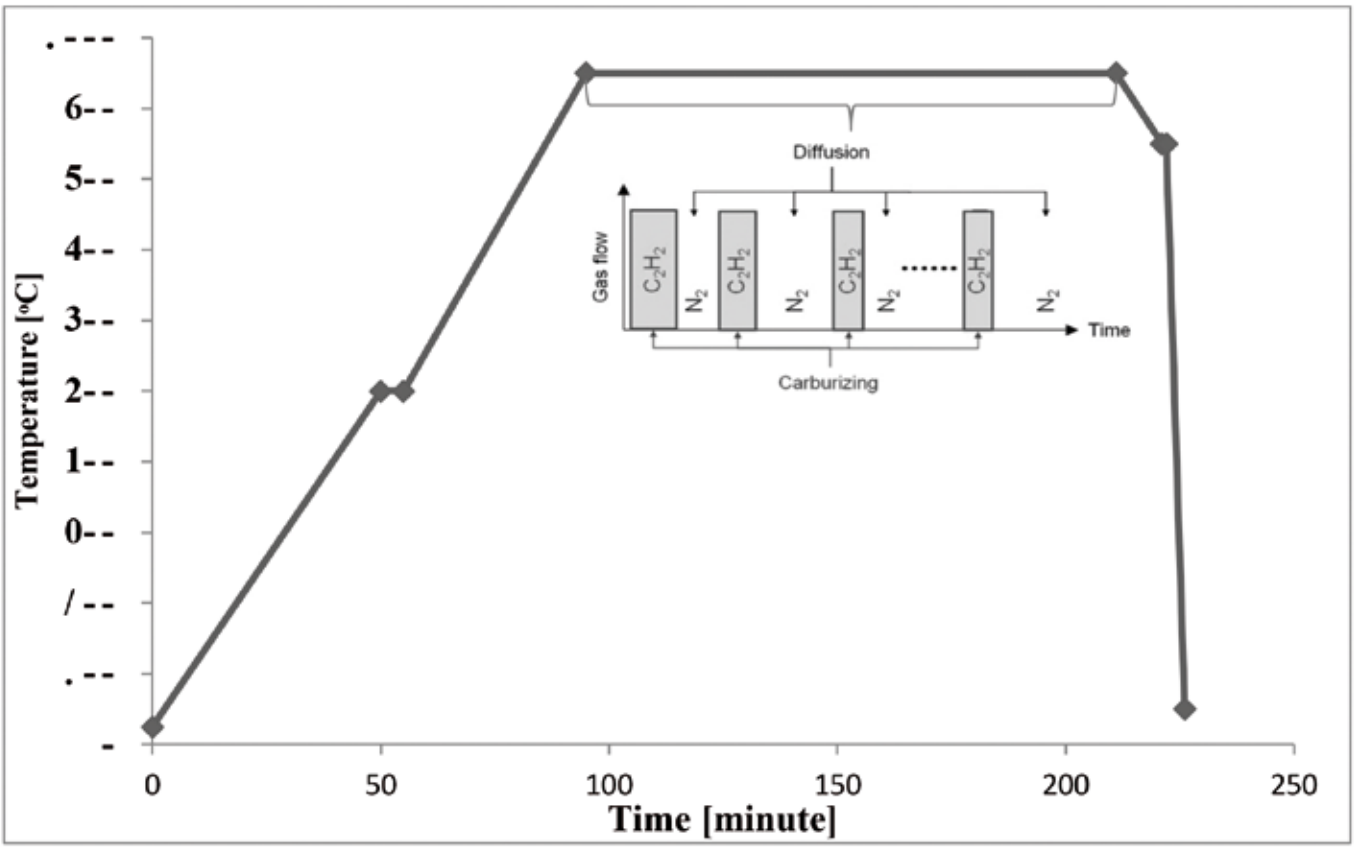

Figure 2. Temperature-Time Curve[4]

The carburizing effects on the microstructure, hardness profile and retained austenite were investigated and the following results were obtained.

4.1. Visual Inspection

After the heat treating, material surface and furnace chamber were examined and soot formation was not observed.

Figure 3 Samples after the carburization

4.2. Hardness Measurement

The hardness distribution of surface layer vary throughout the heat treatment process. At the end of the carburizing, average surface hardness for 16MnCr5 and 21NiCr5 was 700 and 760 HV, respectively. (Figures 3 and 5)

In the cryogenic treatment, the martensitic transformation was continued to lower temperatures and the average surface hardness values were increased by reducing austenite structure. At the end of the carburizing, average surface hardness for 16MnCr5 and 21NiCr5 was 800 and 830 HV, respectively. (Figures 4 and 6)

In this study, the microhardness profile was measured by Vickers Hardness Tester (FutureTech-FM300E) and the load was 500g/15sec.

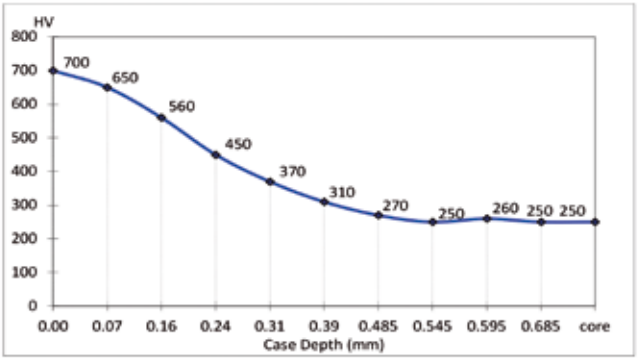

Figure 4. Microhardness profile after the carburizing for 16MnCr5

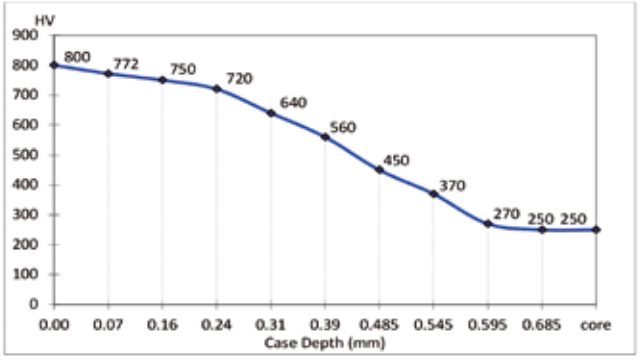

Figure 5. Microhardness profile after the cryogenic for 16MnCr5

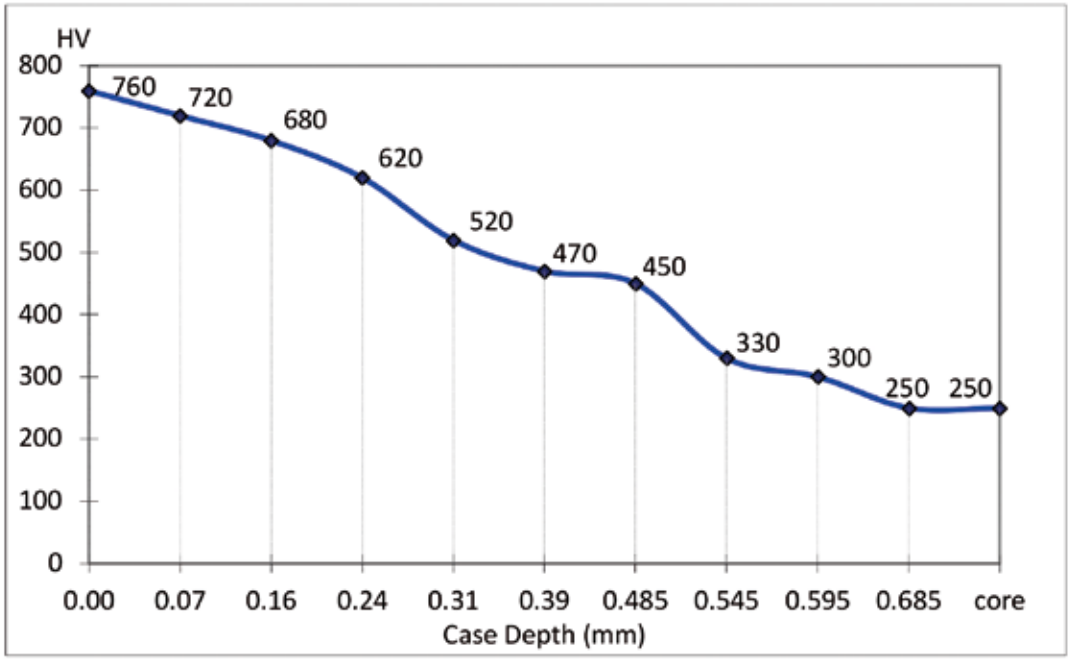

Figure 6. Microhardness profile after the carburizing for 21NiCr5

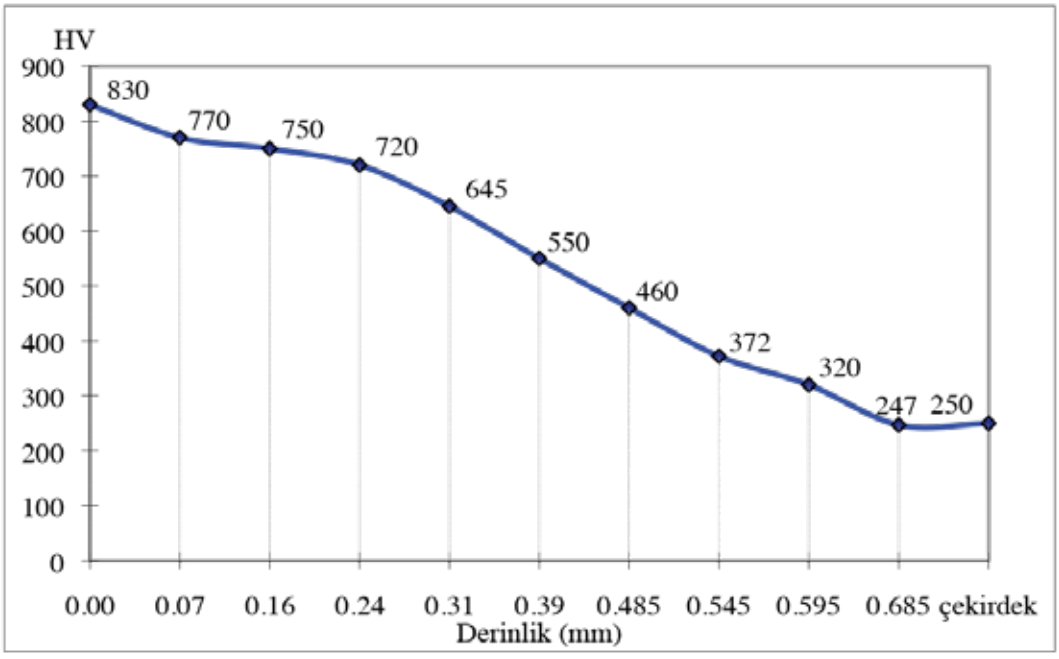

Figure 7. Microhardness profile after the cryogenic for 21NiCr5

4.3. The Microstructure of the Carburized Samples

Figures 7 and 8 are shown microstructures after carburization and after cryogenic treatment for 16MnCr5 and 21MnCr5, respectively.

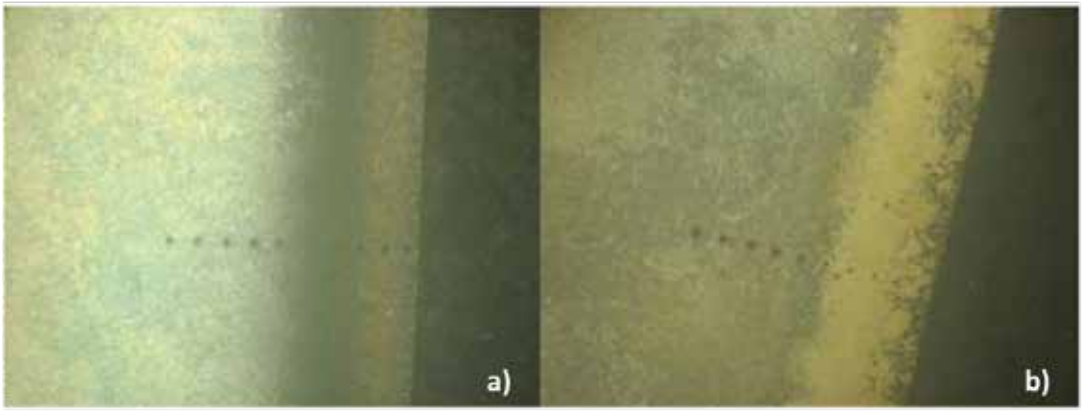

Figure 8 (a) The microstructure after carburizing for 16MnCr5 (50x)
(b) The microstructure after cryogenic for 16MnCr5 (50x)

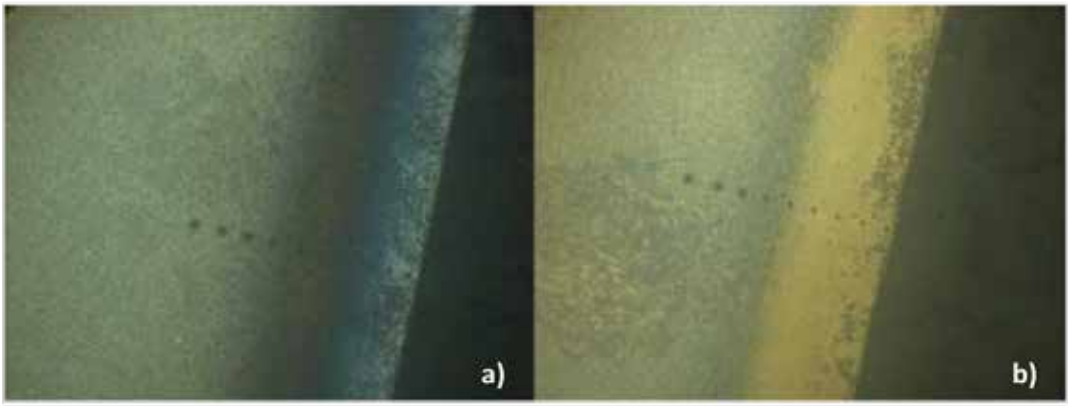

Figure 9 (a) The microstructure after carburizing for 21NiCr5 (50x)
(b) The microstructure after cryogenic for 21NiCr5 (50x)

5. CONCLUSIONS

The comprehensive process for 16MnCr5 and 21NiCr5 steels was designed involving carburizing, quenching and cryogenic steps. Optimum process parameters was prepared and applied taking into account the furnace and material conditions. Then, the properties of steels were improved, microhardness profiles and microstructures were obtained.

At the end of the process, no formation of soot was observed in the furnace and on the surface of the material. When the material microstructure is examined, the martensitic structure is observed on the surface layer.

At the end of the carburizing, average surface hardness for 16MnCr5 and 21NiCr5 was 700 and 760 HV, respectively. Case depth of carbon profile can be increased by changing the process parameters. Retained austenite was removed by cryogenic treatment to increase the hardness homogeneously.

Low pressure carburizing offers, on account of technological advancements, an alternative to conventional gas carburization. Successive heat treatment with VF-1D-A-333-130-1301P type furnace is reduced the operating cost and process time. Carbon potential in the furnace, temperature trend and ramp, carburizing-diffusion steps are controlled from the furnace control screen during the heat treatment.

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SISTEM TEKNIK INDUSTRIAL FURNACES HYBRID MICROWAVE FURNACE

This article is prepared by Alper Keleşoğlu and Seda Korkmaz.
Sistem Teknik Industrial Furnaces Inc.

Microwave frequencies lies between radio frequencies and infrared radiation with the 300 MHz to 300 GHz on the electromagnetic spectrum. The corresponding wavelengths of the microwave are between 1 m to 1 mm as shown in Figure 1.

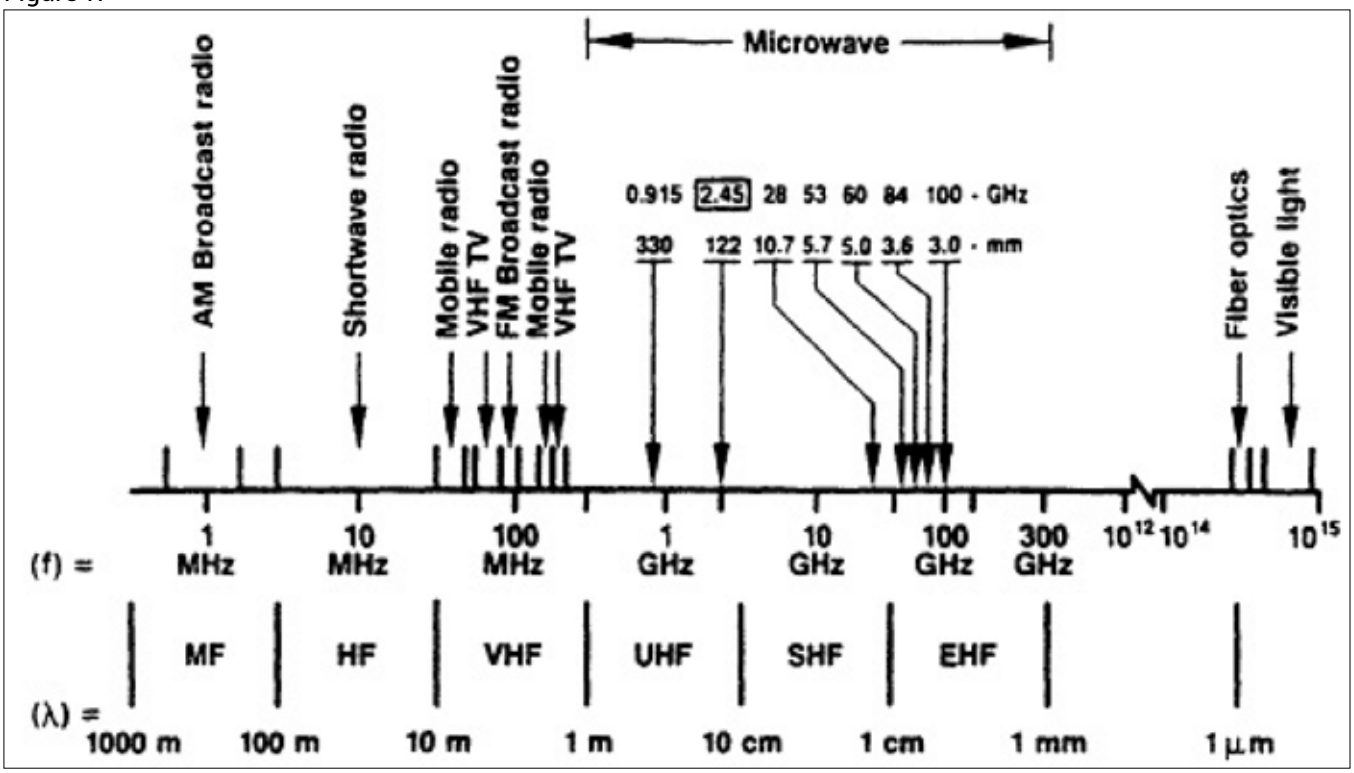


Figure 1. Electromagnetic Spectrum

With these frequency range, the microwaves could be used in two major application: transmission of information (telecommunication)or transmission of energy. The extensive application area of the microwaves are the telecommunication and the industrial, medical, scientific, and military applications. Due to these wide range of applications, the allocated frequencies for transmission of energy with microwaves is limited by the ISM (Industrial Scientific Medical) in order to minimize parasite effects and supply the information security. The ISM allows 915 MHz and 2450 MHz for transmission of energy applications. Nearly all household applications for microwave heating use 2450 MHz, some industrial microwave applications use 915 MHz too. The selection of the frequency depends on the heating purpose.

Microwave heating systems consist of basically three components as shown in Figure 2.

1) Microwave power source (generator): Microwave power source in industrial applications are generally magnetrons which works at 2450 MHz or 915 MHz.

2) Transmission line (waveguide): Waveguides are using in order to deliver microwaves from the generator into an applicator.

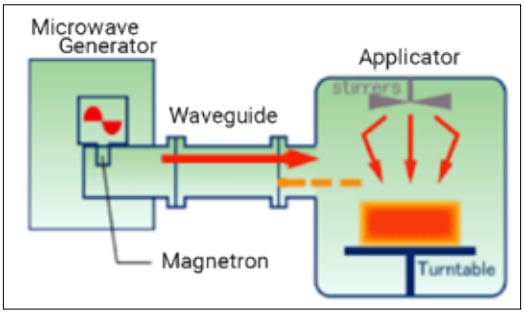


Figure 2. Microwave Heating Basic Components

3) Microwave applicator (cavity): The cavity is the heating chamber where the materials are put in.

Microwave heating is supplied by both electric and magnetic field. Depending on the magnetron power, waveguide and cavity dimension and the electromagnetic and thermophysical properties of the heating material, the field strength varies inside the material and the cavity. In a microwave field, the electric field component oscillates very quickly (at 2.45 GHz, the field oscillates 4.9 x 109 times/sec), and the strong agitation, provided by cyclic reorientation of molecules, can result in an intense internal heating that can lead to heating rates in excess of 10 °C/sec when microwave radiation of a kilowatt-capacity source is used.

When a piece of material is exposed to microwave irradiation, microwaves can be:
a) Reflected from its surface if it is an electrical conductor (e.g., metals, graphite, etc.),
b) Penetrate the material without absorption in the case of good insulators with good dielectric properties (e.g., quartz glass, porcelain, ceramics),
c) Absorbed by the material if it is a lossy dielectric (i.e., a material that exhibits so-called dielectric losses, which in turn results in heat generation in a quickly oscillating electromagnetic field, such as water).
Microwave heating is based on dielectric heating, the ability of some polar liquids and solids to absorb and convert microwave energy into heat. In this context, a significant property is the mobility of the dipoles by either ionic conduction or dipolar polarization and the ability to orient them according to the direction of the electric field. The orientation of the dipoles changes with the magnitude and the direction of the electric field. Molecules that have a permanent dipole moment are able to align themselves through rotation, completely or at least partly, with the direction of the field. Therefore, energy is lost in the form of heat through molecular friction and dielectric loss. The amount of heat produced by this process is directly related to the capability of the matrix to align itself with the frequency of the applied electric field. If the dipole does not have enough time to realign, or reorient too rapidly with the applied field, no heating occurs. The allocated frequency of 2.45GHz employed in all commercial systems is placed between these two extremes, and offers the molecular dipole time to align in the field, but not to follow the alternating field precisely. The heating characteristics of a particular material under microwave irradiation conditions are dependent on its dielectric properties.

When a strongly conducting material (e.g., a metal) is exposed to microwave radiation, microwaves are largely reflected from its surface. However, the material is not effectively heated by microwaves; in response to the electric field of microwave radiation, electrons move freely on the surface of the material, and the flow of electrons can heat the material through a resistive (ohmic) heating mechanism. In the case of insulators (e.g., porcelain), microwaves can penetrate the material without any absorption, losses, or heat generation. They are transparent to microwaves. For some dielectrics, the reorientation of either permanent or induced dipoles during passage of microwave radiation, which is electromagnetic in nature, can give rise to absorption of microwave energy and heat generation due to the so-called dielectric heating mechanism.

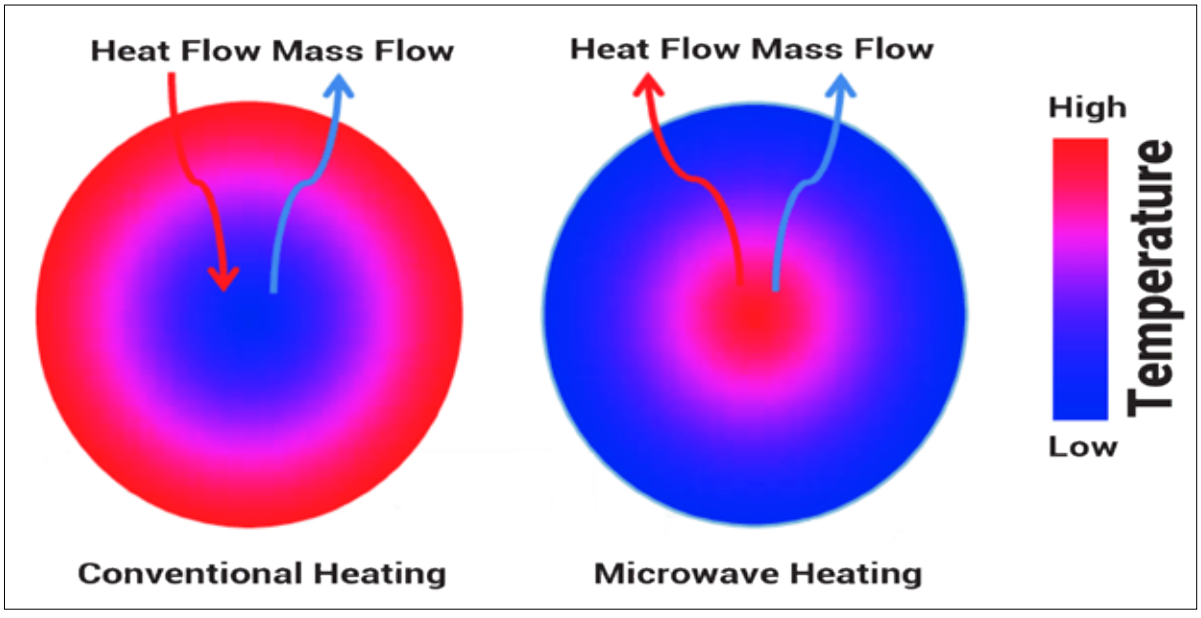
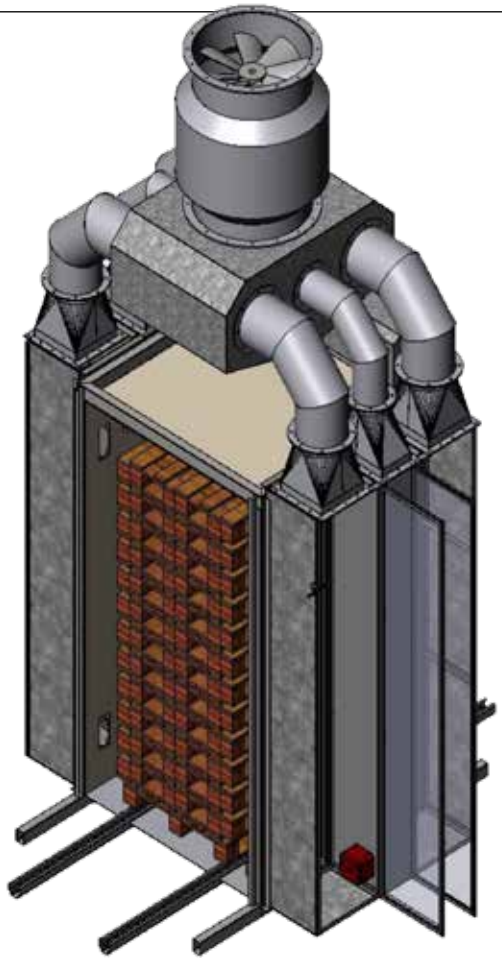
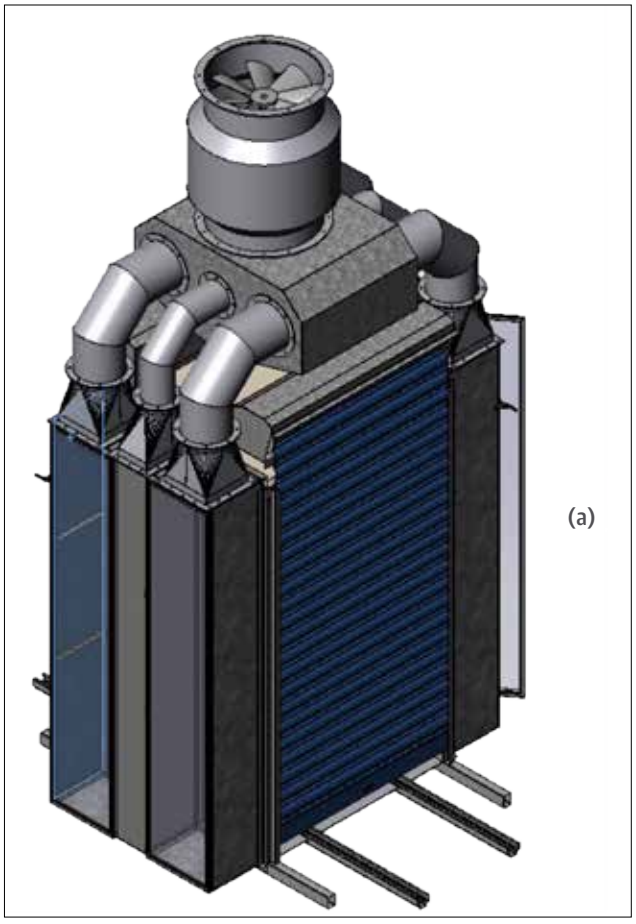


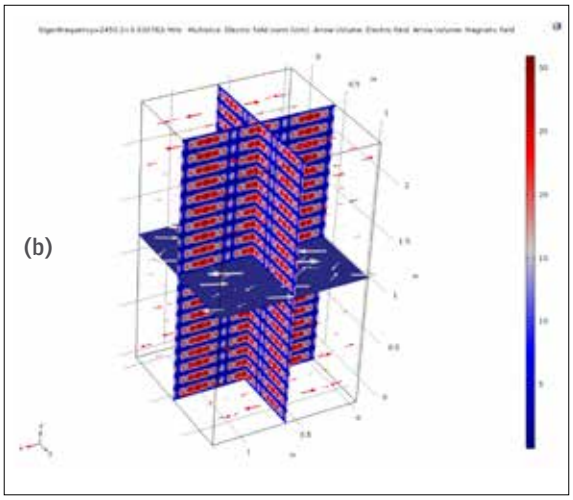
Figure 3. Conventional vs. Microwave Heating Mechanism

With respect to the heating mechanism as described above, it can be said that the microwave heating is a volumetric heating mechanism and it differs from conventional heating (gas fired and resistance heating). The illustrative figure is shown in Figure 3.
Over the last decade, microwave dielectric heating as an environmentally benign process has developed into a highly valuable technique, offering an efficient alternative energy source for numerous processes. It has many advantages compared to conventional heating, such as:
(1) Non-contact heating,
(2) Energy transfer instead of heat transfer,
(3) Higher heating rate
(4) Rapid start-up and stopping of the heating,
(5) Uniform heating with minimal thermal gradients,
(6) Selective heating properties,
(7) Reverse thermal effects (heating starting from the interior of the material body),
(8) Energy savings and
(9) Higher yields in shorter reaction time.

Sistem Teknik Industrial Furnaces has capability to build in this kind of innovative and highly efficient technology by effectively using simulation techniques. For example, the simulation of microwave batch furnace which has multimode cavity can be seen in Figure 4.







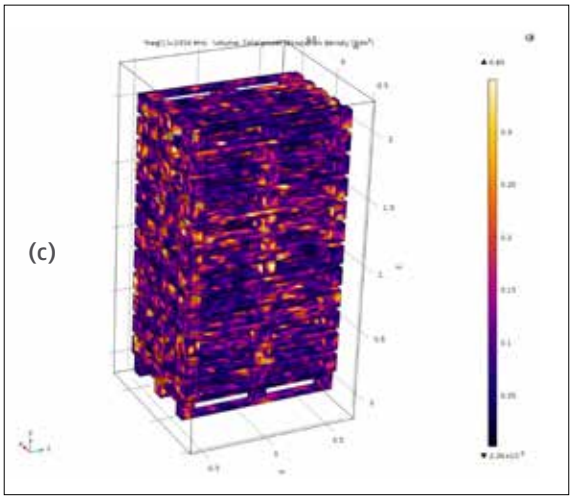


Figure 4. (a) 3D Design of batch type microwave furnace (b) Electric and Magnetic field distribution inside the furnace, (b) Power dissipation (production) inside the material.

Due to the numerous microwave modes has occurred inside the furnace and existence of the pallets, the electric and magnetic field pattern varied whole cross section of the cavity. However, as seen in Figure 4(a), with careful design of the multimode cavity, the distribution of the field strength inside the cavity is homogenised considering the location of the pallets. The complex phenomenon in microwave heating thus could be resolved by using simulation techniques. By determining the reel part of the electric field, it is possible to evaluate the power dissipation inside the pallet as seen in Figure 4(b). By this way the temperature distribution could be obtained and the process can be validated.
Our microwave furnaces also have capability to operate in hybrid conditions by means that assisted by resistance heating. As aforementioned above microwave heating supplies volumetric heating and the material temperature rises from the core firstly. On the other hand, the outer surface of the material is cooled due to the evaporation of water. With the resistance heating, the higher surface temperatures could be achieved by comparison only microwave heating. This helps the moisture transport form the core to the surface. Thus, the hybrid operating conditions accelerates the moisture removal from the material.
Our continuous type hybrid microwave furnace can reach temperatures up to 300°C under atmospheric pressure which is enough also for curing applications. By this way, our furnaces can serve as a purpose of continuous drying of isolation, ceramic, wood and other moisture content materials. The furnace can be seen at figure 4. The furnace has minimum microwave leakage and totally confirms the World Health Organization requirements as a limit leakage value of 5mW/cm2. The furnace has 75 kW microwave capacity which works at 2450 MHz and also approximately 60 kW resistance power in order to stabilize the temperature inside the furnace. At the trials of the furnace, depending on the material type, geometry and moisture content it has been proven that the drying time of the material could be reduced at least %50 in comparison with conventional drying furnaces.

Figure 4. Continuous Type Hybrid Microwave Furnace

Steel industry: automated recycling of waste from blast furnaces

HOT RECYCLING COOLLY CALCULATED

Festo San. ve Tic. A.Ş.

Disposal and fuel costs are an important competitive factor in the steel industry. Industrial waste management company Diproinduca operates a highly productive recycling plant for waste from blast furnaces on the site of the ArcelorMittal steelworks in Mexico. Festo provided a complete solution spanning several levels of the automation pyramid for the plant.

Arn Lázaro Cárdenas - strategically important as Mexico's largest seaport - ArcelorMittal, the world's biggest steel manufacturer, produces steel slabs using the DRI-EAF method. This production method provides a uniform surface texture and improves the quality of the 3.8 million tonnes of slabs produced each year. An important ingredient in slab production is coke. It provides the required heat in the blast furnace during the production process, but it must be recycled afterwards.

Automated raw material hopper: the weighing system measures out the required quantity of waste materials for the specific batch.

Slab production

A slab is an ingot of cast steel, aluminium or copper whose width and length are many times its thickness. Slabs are produced by means of casting and rolling, and are the primary material for sheets and strips. The slab size is adapted to the dimensions of the required product. One of the by-products of slab production is combustion residues from the blast furnace such as coke breeze and furnace sludge. These can be processed and subsequently returned to the combustion process. That is why the steelworks site is also home to a recycling plant, operated by Diproinduca, where this waste is recycled.

Secret to successful recycling

An international company headquartered in Canada, Diproinduca has made a name for itself over the past twenty years in the recycling of waste materials from industrial and steel manufacturing. The company has recycling plants in Canada, Mexico, Venezuela and Trinidad. The specialists in recycling industrial waste transform the waste from the steel manufacturing process into briquettes that can be reused in the steelwork's blast furnace. A crucial element in the production of the briquettes is the accurate mixing ratio for the individual ingredients. Water, cement and selected chemical additives to bind the individual substances are added to the waste.
In Lázaro Cárdenas, precise metering of the individual ingredients is performed by a Festo automation solution. "This is a truly complete solution, where everything from development of the technical concept through to delivery of the control technology was handled by the system solutions engineers from Festo Mexico," explains Alexander Vargas, Head of Process Automation Product Management at Festo.

Perfectly mixed and then shaped

The integrated automation system features a weighing system equipped with load cells on the conveyors and on the cement hopper developed especially for the application. Other components include premixer and mixer technology complete with electric motors as well as the metering technology for water and chemical additives together with the necessary pneumatic process valves. The weighing system measures out the exact quantity of waste materials for the specific batch at the raw material hopper. These are then transported to a premixer, where they are homogenised. Next, water, cement and chemical additives are added in the mixer. Once the mixture has the appropriate composition, the mixer is opened and the entire batch is transported to the briquette machine, which shapes the briquettes.

Successful on all levels

"The Mexican engineers put all of their expertise in process automation, including all the different levels of the automation pyramid, into developing the complete solution," explains Vargas, who supervised the project from the start from Festo headquarters, offering expert assistance when requested. At the sensor/actuator level, all the applicable liquid media flows in the plant are controlled by various automated process valves such as the quarter turn actuator DAPS for opening and closing the butterfly valves.
At the field level, three distributed CPX terminals connected via PROFIBUS DP collect the signals from the field instruments. Well-protected in stainless steel control cabinets delivered ready to install, they can


(A)


(B)


(C)

(A) Perfect climate: the stainless steel control cabinets protect the CPX terminals against the tropical climate of the Mexican coast.

(B) The brain of the plant: the CECX...-PLC at the control level.

(C) The quarter turn actuator DAPS opens and closes the butterfly valves for the liquid media flows at the sensor/actuator level.

Alexander VARGAS
Head of Product Management
Process Automation, Festo

> "Process automation solutions incorporating several levels of the automation pyramid give our customers peace of mind – worldwide."

even withstand the tropical climate of the Mexican Pacific Coast when installed outdoors.
A CECX-X-C1 used as a PLC at the control level acts as the "brain" of the plant. A SCADA system visualises the various areas and equipment in the plant for the operator. Communication with the PLC and the SCADA system takes place via an Ethernet network. The PLC program together with the SCADA system monitors the entire manufacturing process, which can either be fully automatically or manually controlled. The PLC master in the form of the controller CECX-X-C1 processes the information and passes it on to the SCADA software. Four screen views show the general layout of the plant, parameters, events and reports relating to the plant.

Lasting improvement in productivity
"The Mexican system solutions engineers employed all their automation knowledge throughout every step of this project, from technical development through delivery of the control technology to after sales service," emphasises automation expert Vargas. The integration of automation components from all four levels of the automation pyramid results in highly efficient recycling of coke, which is valuable as a fuel, and in the process helps the environment and improves the productivity of slab production.

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A NEW CONVENIENT & INNOVATIVE SCADA SOLUTION; EAGLEYE RSD® BY 3E INDUSTRIAL ENGINEERING

3E Industrial Engineering, the company in which the years of innovation and experience meets with perfect engineering knowledge. After analyzing the needs of automation industry for years, 3E Industrial Engineering has designed the Eagleye RSD® so that their clients can customize their own user interfaces however they wish with specialized solutions.

We would like to be acquainted with your company, could you explain your product to us?

Our company 3E Industrial Engineering was established in 2005 for providing prime & qualified services for automation and coding industry. 3E stands for “Expert”, “Exclusive” and “Engineering”.
Founder of our company, Gokhan Lale achieved the first steps of our company's foundation thanks to his education in Tuzla Technical High School and his Electrical Engineering education in Kocaeli University. With his years of experience in the industry, he has guided

our company's business scope. Since our first day of action, we have become a solution partner for more than hundreds of projects over 30 countries.
In year 2008, we started to develop the Eagleye HQM® for heat treatment process control needs. In year 2009, we made the first installation and since 11 years period from 2009 to today, we have developed our software more and more each day thanks to our precious business partners all around the world. Its main difference compared to other ERP software is that we provide special solutions over WPF based UIs also over web and mobile applications.
After we develop the Eagleye HQM® software, we have decided that we should develop a software that could record the process data over ERP, which has become our Eagleye Trend Recorder® (ETR) software. Thanks to this software, we have managed to communicate with machines and other control devices to provide information to Eagleye HQM®. Eagleye Trend Recorder® also has become the worldwide prime software for data acquisition from field. Eagleye ETR® software has also formed the foundations of SCADA Designer software, which has been one of the most important goals of our company since the day it was founded.
Since the foundation, we have given impotance to R&D and we have carried out many projects in Turkey as first. We moved our center to Marmara Technocity Technology Development Zone in 2014. After moving to Technocity, our first R&D project was to design and develop a portable heat treatment machine for stress relieving after and before welding processes. By improving these imported machines, which work between 81-132kW, in our R&D center, we introduced the Eagleye PHT® to our clients by 2015. By the year of 2016, thanks to contacts we reached at global exhibition, we started to engage in business with companies from Europe, USA and China. By virtue of these contacts we made our first export to Far East. With the experience acquired from development of Eagleye ETR® and customer experience and know-how we obtained, we have finished the development phase of Eagleye RSD® and have started its test-runs.

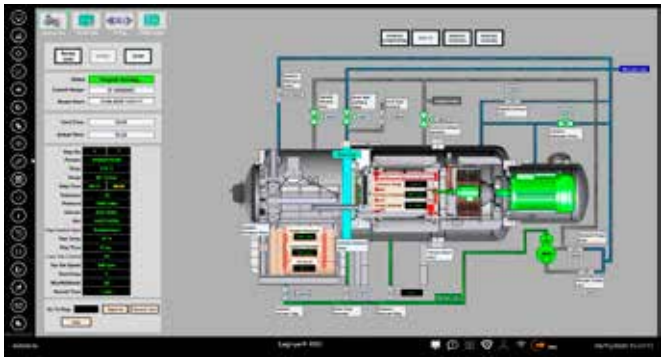
GÖKHAN LALE
Genel Müdür

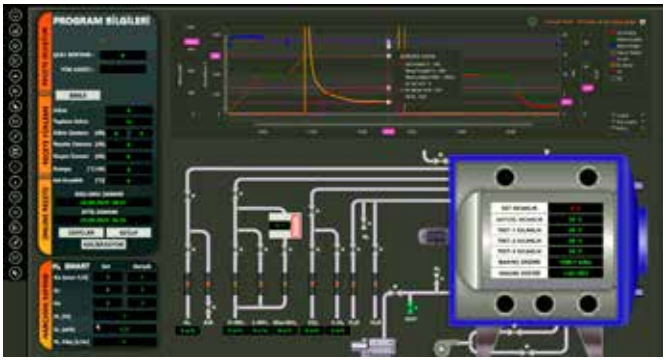
MELTEM DAĞDEVİREN LALE
Ticari Direktör

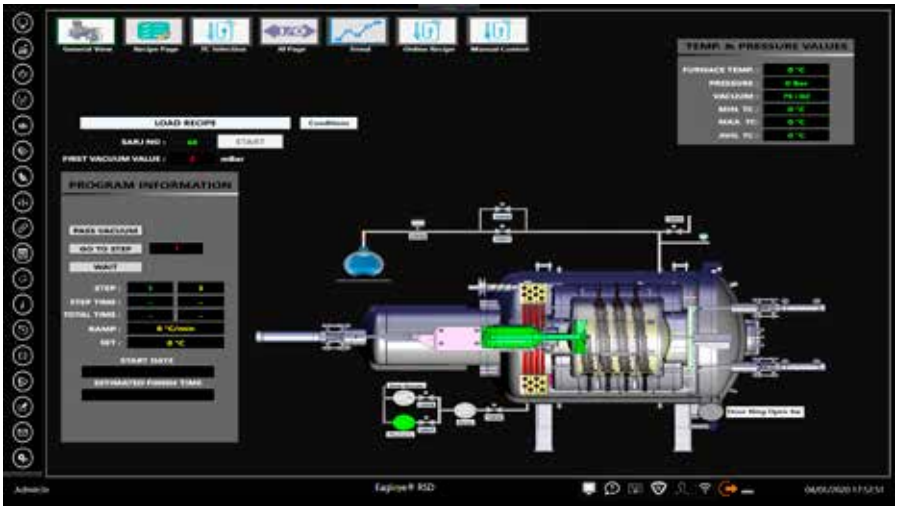
Could you give more details about the Eagleye RSD

As you might noticed, our products acronym is formed by the initial letters of Runtime SCADA Designer. Eagleye RSD® is more than a standard SCADA software; it is developed by our R&D department with years of experience and

WE CAN SUMMARY EAGLEYE RSD® AS A PROGRAM WHICH HAS BEEN MIXED WITH EXPERIENCE FOR YEARS, IS HIGHLY EASY TO USE AND INCLUDES SPECIAL FUNCTIONS.







AS AN EXAMPLE, FOR A PIPE BENDING MACHINE MANUFACTURER WE HAVE DEVELOPED A 3-D GRAPHIC SIMULATION THAT SHOWS THE PROCESS IN REAL TIME. ALSO FOR TWO OTHER COMPANIES, WE ARE DEVELOPING A GCODE ENTEGRATION AND ROBOTIC ARM CONTROL MODULE.

know-how we obtained from our customers. It is a user-friendly software with many customizable options depending on your needs. Eagleye RSD® can take care of your redundancy, server/client and web server needs and more with its customizable and easy to learn functions depending on solutions you require.

What are the advantages provided by 3E Industrial Engineering to its clients with Eagleye RSD®?

While we were developing the Eagleye RSD® ,our main goal was to provide an easy to use, user friendly software which also could deliver many solutions for many different problems. We have integrated special functions developed according to the needs of users and not found in any other SCADA software into our software. This is also an indication that we can integrate different special functions into our software by responding to special requests that may arise even if they are not currently available. Our Eagleye RSD® software, in which you can find all the features you are looking for in an advanced SCADA program, will positively contribute to the project time and budget of the users.

Among these solutions, do you have any success stories about machine industry you would like to share?

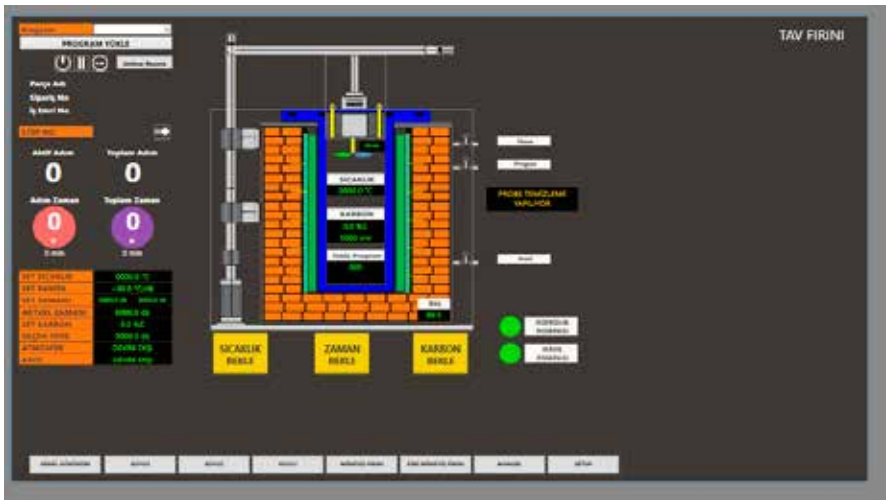
Between the years 2019 & 2020, we used and tested Eagleye RSD® over hundreds of projects locally and internationally with success. We can give many examples for which we worked during this time. For instance, we have added a functional recipe defining feature to our software for one of Europe's biggest furnace manufacturer for their Fire-Resistance Test Furnaces. For a pipe bending machine manufacturer we developed a 3-D graphic simulation that showed the process in real time. Also for two other companies, we are still developing a G-code integration and robotic arm control module.

What would you say about the importance of SCADA software for Industry 4.0 and beyond?

For those machine manufacturers and automation companies which are aware of the dire need of digital transformation, SCADA software usage has become almost an obligation. For the past years, it was only a necessity in aerospace and automotive industry. However, it is a need for many industries today. Especially with rise of Industry 4.0 standards' acquisition of production data from field and the evaluation of the data have become a trending topic for every industrial leader. A SCADA software would help you with control of your machines remotely and it will also help you evaluate the data acquired from those machines to optimize your production.

Anything you would like to say about your future goals?

With our innovative and convenient software, we hope to become a solution partner for machine manufacturers and automation companies; and bring our software to a global level.



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- Atmosphere Controlled Furnaces
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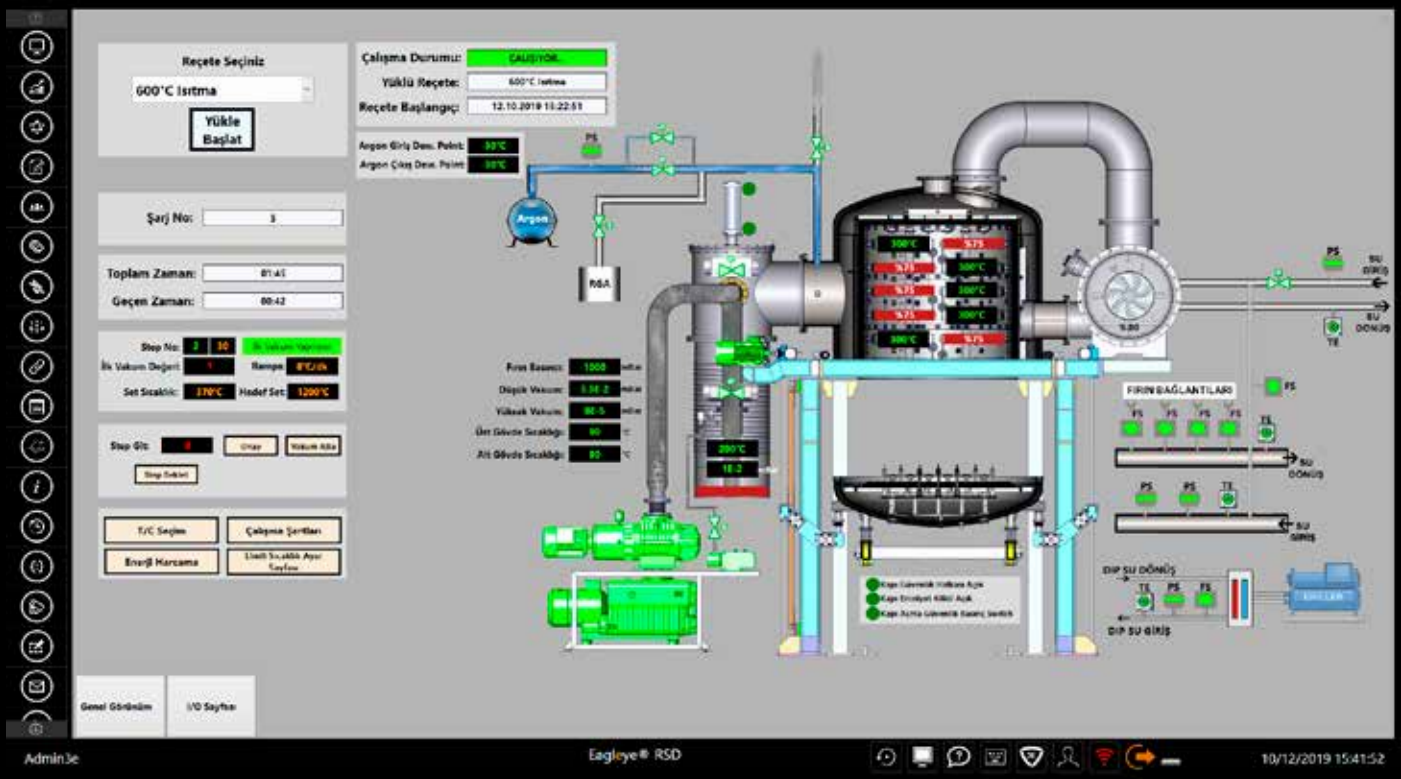

SPECIAL TOOLS (GCODE, PIPE BENDING ETC.) - UNLIMITED SCREEN DESIGNER - EVENT & TIME SCRIPT - ALARM MANAGEMENT - USER MANAGEMENT - SMS & E-MAIL NOTIFICATIONS - WEB SERVER - REPORT DESIGNER - RECEIPE MANAGEMENT ... MORE

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AMS2750

AIAG CQI-9

CCPI Europe

Excellence in Temperature Measurement

Temperature Sensors | Thermocouple Wire & Cable | Calibration | Servicing

Bringing Industry 4.0
to the
Heat Treatment Industry

The evolution of technology appears to be growing exponentially with no sign of slowing down any time soon.
Our homes are smarter than ever, our phones are growing more advanced every year, to the extent that the average smartphone now has over 100,000 times more processing power than the Apollo 11 computer that put a man on the moon in 1969.

But what about manufacturing, specifically for those in the heat treatment industry?
Do you ever get the feeling that manufacturing has fallen behind in the technological revolution that is Industry 4.0?

CCPI Europe are not just the industry leading experts in the manufacture of high-quality industrial temperature sensors, and providers of thermal calibration services to the heat treatment industry, we are also on the front line of bringing Industry 4.0 to you.

Since it was first accredited in 1998, the CCPI Europe UKAS accredited Thermal Calibration Laboratory (No. 0600) has been subject to significant investment in bespoke automation solutions. Not only does it operate in the temperature range of -200° C to 1600° C and holds some of the tightest uncertainties of measurement by a commercial calibration laboratory. The advanced automation makes the processes more efficient for our customers, reducing associated costs such as furnace down time and reducing the painful task of data entry.

In 2017, CCPI Europe launched a FREE mobile app which pairs with the smart labels on all our thermocouples with a view to eradicating the human error aspect from the thermocouple data entry process.

PYRO Tag

Critical data such as: serial numbers, calibration data, correction factors and certificates are automatically uploaded to the cloud and is available to you, securely at the tap of a button 24/7. With the option to send all of the data to the users email address, the process from sensor calibration through to use of the sensor in your furnace is completely free of human error.

During the following year, CCPI Europe advanced its Industry 4.0 automation by partnering up with C3 Data, the cloud-based furnace compliance software subscription service designed exclusively for heat treaters and pyrometry laboratories. The software is designed to streamline the time spent on testing and repairing furnaces, reducing the costly process of downtime. The partnership between C3 Data and CCPI Europe allows our sensor data to be automatically uploaded via the smart tag QR code.

The C3 Data desktop portal has a real time dashboard of your registered equipment and clearly shows if your equipment is compliant with the required specifications. Gone are the days of waiting until the next TUS or SAT is performed to find out if a batch of material was processed in a furnace that was outside of tolerance. A few quick clicks and full in-depth reports can be produced, electronically, in real time should an auditor request those documents.

Technology helps to: create opportunity, connect the furthest corners of the world and provide solutions to the problems that people simply can't solve. As we all strive to create a cleaner, greener, more efficient planet for future generations, the advancements of today will be more crucial than ever.

The Industry 4.0 integration provided by CCPI Europe are bringing the ancient processes of heat treatment flying into the 21st century and beyond.
Integrating technology into the manufacturing process saves time, reduces unnecessary energy usage, stops costly human errors, keeps downtime minimised and allows you confidence in your processes, giving you the simple pleasure of peace of mind.

Integrate Industry 4.0 into your pyrometry practices with a free trial month of C3 Data AND a free SAT Sensor with Pyro Tag smart tag!

Contact CCPI Europe now.

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BÖHLER FEELS THE PULSE OF STEEL QUALITY IN 50 COUNTRIES

Having been identified with quality in steel industry for generations thanks to its achievements, Böhler continues its activities with the aspiration to reach higher achievements.

Böhler is a company that exceeded boundaries with its success in Turkey, and they currently operate in 50 countries. The successful company, having successfully finalized every contract awarded to them, provides competitive edge with innovative and smart solutions that they offer to their customers.
Böhler Sales and Marketing Director Can Tulgarer mentions a particularly important point as he briefly introduces the company: Motivation and dynamism achieved on the way to improvement.
'Currently, Böhler has been operating in Turkey for over 50 years. High quality tool steel, high-speed steel and special steels have become virtually synonymous with Böhler brand. Therefore, there are equally high expectations from such a recognized brand with 'technically' strong content. This responsibility keeps us dynamic as we strive to perform our job better.'


Can TULGARER
Böhler Sales and Marketing Director

Continued success in 50 countries
Böhler is among the well-established companies in the industry, which transcended the borders of the country and managed to make a name for itself throughout the world. Can Tulgarer expresses this worldwide success of Böhler with these words: 'Our company operates in 50 countries throughout the world. This, of course, enables us to conduct operations with global players and reach a quite large database. Issues that we experience for the first time may turn out to have already been solved, and we encounter them along with their solutions. We are able to offer the know-how, which we obtained in years, with our customers.' Böhler steels, used in all kinds of products and fields of production regarding our daily needs, are required in several different sectors. Tulgarer describes the fields of use of Böhler steels: 'Böhler steels are used in all kinds of products and fields of production regarding our daily needs. Some examples include cutting tool industry, blade industry, die-cast parts, plastic mold production, food industry, cutting, bending and boring operations. In addition to these areas, production of die-cast and special materials, aviation industry, turbine construction, energy generation, medical products and medical industry, glass industry, oil and natural gas industry also assume key positions.'

Wide production range of Böhler is as follows:
- Tool Steels
- Hot Work Tool Steels
- Cold Work Tool Steels
- Plastic Mold Steels
- HSS – High Speed Steels
- Powder Metallurgy Materials
- Special Steels
- Stainless Steels
- Valve Steels
- Stainless Steels for Glass Industry
- Special Steels for Aviation Industry
- Special Steels for Oil and Natural Gas Industry
- Inconel Alloys
- Sheets and Plates

With the consciousness engrafted by the corporate culture into the company and its employees, Böhler brand

prefers to become solution partners of its customers, rather than being a company that only sells materials. It fulfills expectations of different industries with its local and foreign team of specialists. Böhler, having a structure that hears and tries to understand its Customers, briefly, that is focused on being Customer-oriented, witnesses the positive reflections of this principle with ever-increasing customer feedbacks.

Remarks of Solution Partner Kirpart company about Böhler:

Opinions and evaluations of Kemal Atamay, Foundry Manager of Kirpart company, which is one of the most suitable partners of Böhler for this definition of solution partner, and which is one of the leading actors within Turkey and throughout the world in its field with parts manufactured in AL Injection area, are as follows:

'Kirpart is the solution partner in production of high-quality and low-cost aluminum injection cast components, needed by automotive sector in Europe. In this sector, which develops quite rapidly and dynamics of competition of which become more challenging day by day, the design of mold that is in the heart of production and particularly the selection of suitable steel are determinant factors in the outcome of the project. During studies conducted within the company, steels from several brands were used and different heat treatments and surface coatings were tried on these steels.

During studies conducted with our solution partner Böhler, part geometries and mold designs are analyzed to determine the most suitable steels and heat treatments within the scope of continuous improvement. Thanks to these studies, our initial maintenance period, which used to be 25 thousand presses, reached 50 thousand presses, followed by 50% improvement of maintenance activities performed on molds during the guaranteed economic life.

Thanks to these high-performing steels, selected in line with mold operating conditions, early formation of wear, sticking, cracks, and breaking on steel surfaces was completely eliminated. Thus, sharp and pointed faults, occurring on part surfaces, did not occur, no labor costs were required for these faults, and there were no interruptions / expenses for steel maintenance.

Upon reduction of interruptions, OEE figures were improved, cycles were reduced due to selection of steels with high thermal conductivity, and thus, capacity was created for new projects without the need for investment.'

1.2343 ESR steel that we had to maintain due to thermal cracks and breaking after 20K presses

BÖHLER W350 that continued production after 50K presses.

Sticking and wear issues were experienced in the area opposite feeder input (1.2343 ESR and different surface coatings)

No wear and sticking issue was encountered after 40K presses with BÖHLER W360 ISOBLOCK. (W360 ISOBLOCK)

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Low NOx emissions, 20:1 turndown ratio; rugged designs for oxidizers, process heaters, kilns, furnaces, dryers, waste incineration and other high temperature applications.

- Sytems
- Burners
- Technology
- Safety
- Control
- Fire Resistant

MAXON KINEMAX

- High temperature burners
- Medium output speed (reach up to 80 m/s)
- Provides homogeneous heat distribution without demaging the oven wall.
- Fuel: natural gas, oil
- Turndown ratio 48:1

REVISION PROVIDES EVEN BETTER

A GOOD EXAMPLE OF REVISION PROJECT BY COOPERATION OF GROUPE ATLANTIC AND SARVION

In this issue we have heard about a good example of cooperation between Sarvion and Group Atlantic which is one of the biggest radiator producers among the world. Groupe Atlantic produces radiator with the vision of transforming existing energies into sustainable comfort. Arif Şahin, successful Industrialization Manager of the company has explained the cooperation between two companies and the advantages of the project.

Groupe Atlantic was founded in France in 1968 and became a leading company in the world as a group with its various products and brands specialized in heating technologies especially radiators. Groupe Atlantic is a big family consisting of 9400 team workers in 28 different industrial zones with 38 facilities. With the vision of creating eco-efficient solutions, Groupe Atlantic provides variety of brands and products to make available for everybody. We have asked about the cooperation and revision project with Sarvion regarding their existing brazing furnace, Industrialization Manager Arif Şahin has answered our questions in an utmost sincerity. Arif Şahin has made a point in the end as a message to Sarvion management as well, we thank him once more for this interview. We hope you enjoy!

Could you please make a short introduction of Groupe Atlantic which is one of the world leader radiator companies?

Groupe Atlantic was established to manufacture heating devices by Pierre Lamoure and Paul Radat in 1968 in France. Today, Groupe Atlantic produces mainly combi boilers, heat pumps, heating devices, ventilation devices and air conditioners with 9400 employees worldwide in 28 different industrial zones with 38 facilities. Our mission is to transform existing energies into sustainable prosperity. While doing this, we want to make it accessible for everyone. Offering thermal comfort solutions also has a big responsibility to make it as much as environmentally friendly and efficient. These are our priorities while producing. Groupe Atlantic started towel radiator production in Torbalı district of Izmir in 2008. In 2020, movement of the equipment into the Aegean Free Zone has been completed and it currently continues its activities in its completely new facility.

Arif ŞAHİN
Groupe Atlantic Industrialization Manager

What is the importance of the Brazing Furnace for Groupe Atlantic and why has Groupe Atlantic needed this revision project provided by Sarvion?

Brazing furnaces are used to provide most aesthetic welding of the pipes of towel radiators. Because of that it plays a key role in our production aligned with the group missions. This modernization is important for us because it has provided us to be able to work with a more efficient furnace and have a longer life time of the equipment.

Could you please comment on how the project has been realized by Sarvion and made a general evaluation?

Revision processes within the framework of this project were initiated in our old facility in Torbalı. Thanks to this, a comfortable and big working environment has been provided to Sarvion team. From the brick to its functional sensors and devices, all parts of the furnace have been renewed. After the cold tests are successfully completed, we have moved the furnace to our new facility. By carrying out the serial production trials within the plan, we have started mass production on time.

Well, as a result of modernization what are the gains in terms of business happened? Can we say that your expectations about the project are met?

As a result we have one more 100% functional brazing furnace in operation. Working lifetime has been extended and the automation system has been renovated in compliance with current technologies. And this has enabled our Process Department easier control, monitor and intervention abilities.

Lastly, what are your thoughts about Sarvion?

Cooperation with Sarvion firm has been very pleasing since from the project was born to the end. Sharing knowledge and information have improved both parties. Most importantly, we have gained a flexible solution partner which can adapt themselves according to changing plans.

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TURKEY'S PROUD IN HEATING AND AIR CONDITIONING: DEMİRDÖKÜM

Operating in the sectors of heating, water heating and air conditioning, DemirDöküm reinforces its success with the firsts it offers to our country. DemirDöküm, which continues its success adventure that started in 1954 in the leading position of its sector with its widespread network of authorized dealers, authorized service and sales points, also contributes significantly to the development of Turkish industry.

Ahmet Zafer ŞENOL
Job Preparation and Production Process Development Manager

We have had an interview with Ahmet Zafer Şenol, DemirDöküm Business Preparation and Production Process Development Manager, on the cooperation with Sistem Teknik and the company strategies implemented in the Covid-19 process. We wish you a good reading.

First of all, we would like to briefly introduce you to our readers.
Can we get brief information about your company? Türk DemirDöküm, founded in 1954, has been operating in the heating-cooling sector for 66 years. In 2007, it joined the Vaillant Group. Our production facilities are located in Bozüyük and our central office is in Istanbul. Our group central office is in Remsc-

heid, Germany. I have been working within the Vaillant Group for 11 years and have been working in the Industrial Engineering department for the last 5 years.

Could you tell us something about your cooperation with Sistem Teknik? What kind of products and services do you use?

In our Bozüyük facilities, we design and manufacture heat exchangers ourselves, which are one of the most important components of our combi-water heater products. Our cooperation with Sistem Teknik also started with the tunnel furnace product we needed in the heat exchanger welding process and has continued efficiently until today.
We hope that we will strengthen our work by maintaining this meaningful cooperation for many years.

The furnaces produced by Sistem Teknik are used by many companies operating in the heating, water heating and air conditioning sectors. We see that you use this furnace in the production of water heater heat exchangers. In this sense, how did Sistem Teknik contribute to your efficiency?

Here, product and production efficiency are very important to us. We have considered these two criteria while designing our furnace Together with Sistem Teknik. We have been following our quality rates, scrap amount, energy consumption and production efficiency since the date we commissioned the furnace, and we are still observing improvements.

What are the technical criteria for your preferred industrial furnaces in the production of water heater heat exchangers?

We have been producing heat exchangers for nearly 30 years and it is a process that we have comprehensive knowledge of. While renovating our furnace, the new technological possibilities offered by Sistem Teknik and its suggestions to increase the process efficiency have played an important role in our selection. We have achieved good results from the cooperation of these two companies, which have a grasp of heat exchangers and furnaces.

During the Covid-19 outbreak, radical changes have been seen in the production strategies of many companies. What strategy have you adopted in this process?

As you have mentioned, we observe the effects of Covid19 in almost every sector. Vaillant Group, a global company, follows this process very closely and manages it transparently and effectively using group synergy. We get the positive results of both local decisions and joint decisions made by the group. As DemirDöküm, we continue our contributions to our economy without slowing down even in this difficult period that our country is in.

Finally, can you share your goals for the next year, hoping to leave behind the effects of this difficult process due to Covid-19?

We carefully follow all the difficulties of the process and prepare ourselves for all kinds of conditions. We set our goals in 2021 accordingly.

> "Şenol has stated that as Demir Döküm, they take two criteria as product and production efficiency in the design process of their furnaces, and that the new technological possibilities offered by Sistem Teknik and their suggestions to increase the process efficiency play an important role in the cooperation."

VULCAN KMG, ONE OF THE POWERFUL ACTORS OF THE MOLD INDUSTRY,

GAINS RECOGNITION WITH ITS ENVIRONMENTALLY SENSITIVE STRUCTURE

Please think of a company which pushes the boundaries of excellence in every work, both makes a strong contribution to the development of Turkey's industry, and continues by building an environmentally sensitive development of all these structures. Here is the name of that company; VULCAN MOLD METAL DEVELOPMENT LTD., one of the leading companies in the mold industry.

Enis MEN
VULCAN KMG Ltd. Metallurgical Engineer
Business partner

Vulcan KGM, which has its name printed in gold letters in material and heat treatment technologies, is among the first users of the vacuum hardening furnace that Sistem Teknik first produced domestically. With this valuable collaboration with Sistem Teknik since 2003, Vulcan KMG achieves efficiency in many processes, software and solutions. In our pleasant interview with Vulcan KMG Metallurgical Engineer Enis Men, we have talked about the past and present of the successful company; we have learnt important information about the cooperation with Sistem Teknik. We wish you a good reading.

Can we get brief information about Vulcan KGM 's production which is one of the leading companies in the mold industry?

Can we get brief information about Vulcan KGM 's production which is one of the leading companies in the mold industry?
Our company Vulcan KMG Ltd. was established in 2008 in Manisa as the Aegean regional dealer of Korkmaz Çelik Commerce and Industry Inc. It operates with the aim of selling and heat treatment of high quality tool steel and engineering materials for the molding industry. Although our job is not direct mold manufacturing, we work with our business partners, mold makers. In material and heat treatment technologies, we focus on the damage and analysis of mold materials that may be encountered during the working process, and performance-enhancing methods for more efficient production. Therefore, we move forward by supporting them in parallel projects with

the mold sector. Our basic view on this business; we believe that the use of materials and heat treatment technologies that can "reduce the cost of the unit part to be obtained from the mold" in a much broader vision instead of costing molds cheaply creates a much more effective added value.
The mold industry has a market share of over 85 billion Euros worldwide. This sector is proceeding on the basis of increasing its market share with stronger day by day in Turkey. Parallel to this, Mehmet Ganiyusufoğlu, the founder of Korkmaz Çelik firm and our dear elder, said, "Defective heat treatment destroys the best quality steel. We are aware that even the best heat treatment cannot add much value to a poor quality steel" and we are aware that material and heat treatment technologies are always a very important denominator.

How did your you meet with Sistem Teknik? How did the idea of choosing a vacuum oven come about?

Sistem Teknik has made many firsts in Turkey. I think that its development in heat treatment technologies and especially in vacuum heat treatment furnaces is also of great importance for our industry. In 2003, the first domestic vacuum hardening furnace produced by Sistem Teknik was an important step for the Turkish industry. I became one of the first users of a project that started in those years. Until that day, there were vacuum furnaces coming from abroad with very high operating and maintenance costs. The fact that these furnaces were produced domestically brought the serious advantages of offering high quality heat treatment to the molding industry. As a result of heat treatment of mold steels in vacuum furnaces, more stable metallographic structures have brought about lower deformation and much higher surface qualities.

Although the history of heat treatment was not known at that time, its practice was long before the industrial revolution. For example, the sudden cooling of blacksmiths by dipping them in water after forging the swords to strengthen them is a simple heat treatment. In our country, with the industrialization, it was started to be applied technically in the 1950s, and heat treatment theories were also developed and understood. The most important points of heat treatment theories; it is ensured by the simultaneous control of temperature, time and atmosphere, and the creation and management of appropriate conditions. These process parameters mentioned in vacuum furnaces can be controlled extremely precisely. As a result, the quality of the process is high, operator factor ensures that it is independent, repeatable and improvable. For these reasons, we prefer to use vacuum furnaces in our heat treatment facility.

Vacuum furnaces are widely used in the heat treatment industry. As a company that uses vacuum furnaces in your production, can you explain what has changed in your production environment with the vacuum furnace?

First of all, it would be more correct to approach this question in comparison with other heat treatment methods. As we mentioned, heat treatment should be considered as a function of temperature, time and atmosphere. On the other hand, energy and environmental awareness is very important today. In particular, the impact of industry on the environment is a very important issue that we should all emphasize. The energy consumed in providing the necessary temperature for heat treatment creates a factor that must always be controlled in terms of carbon emissions in the atmosphere. There are too many parameters that we can or cannot manage while obtaining this heat. In vacuum furnaces, this heat causes energy con-

> It is our preference that Sistem Teknik supports us to provide uninterrupted service in the most developing working process, provides a strong and technical staff, a service network where we can reach a fast solution, and supports furnaces and systems that it produces for spare parts at its own time.

sumption as required by the relevant workpiece and is provided at high efficiency without creating any flue gas that causes pollution.
Our company is extremely sensitive to the environment in this regard.
A few months ago, Korkmaz Çelik A.Ş. It has completed an important investment. We use heat treatment for the first time by obtaining electricity from our solar panels plant in Turkey. Currently, our factory is equipped with 1.500m2 high efficiency solar energy panels and we provide most of the energy we consume from the sun. Of course, working in high temperature environments is also very important in terms of employee health and brings many different working difficulties. However, in the working environment of vacuum furnaces, this temperature is not perceived from the outside, while providing heat efficiency, on the other hand, it also keeps working safety at a much higher rate. Thus, vacuum ovens offer business-friendly technologies in terms of both the environment and employees.
Another important point is that hazardous wastes (cooling oils or chemical salts, etc.), which are generated as a result of heat treatment, which causes environmental pollution and many of which are not quite possible, do not occur in vacuum furnaces.
When we bring these and many other parameters together, the result we achieve creates a much cleaner and healthier working environment and motivates us to innovate the work we do.

In this context, we would like to hear from you the importance of the service you receive from Sistem Teknik in the operation of your company.

One of the issues that our company attaches great importance to is the preference of domestic producers in our investments. We attach great importance to this both in order to progress and grow with the domestic producers and to live and proceed the development in our production tools together. For this reason, it is much more efficient for us to work with local producers who are specialized in their fields.
Our heat treatment facility is able to compete with world standards. Including the first domestic vacuum furnace made in Turkey, during our visits abroad in different parts of the world, we see an industrial furnace working with ST logo and we are quite proud of it.

Can we get information about your R&D investments and studies?

Our job is to progress at a extreme speed with the renewed material qualities and applications depending on the constantly developing technological parameters. Therefore, we do not aim to sell only one product to the companies we serve. We are aware that our responsibilities for the sold product continue. We also raise our expectations with our customers, whom we see as business partners. For this reason, in our heat treatment process, we conduct extensive studies with the Turkey distributor of steel Korkmaz his Japanese HITACHI METALS. Our company has a wide-ranging metal-

lography laboratory. Together with our engineering team, we carry out analysis and experimental studies on steel materials and their heat treatment processes, both in line with the needs of our customers and on processes that will improve our heat treatment processes. Our ongoing university-industry cooperation is of great importance both for us and for the Turkish industry in this sense. On the other hand, we hope to continue our investments by analyzing and designing our needs in new generation vacuum furnaces together with Sistem Teknik in the coming days.

What kind of company strategy did you adopt in the Covid-19 process and new normal?

Unfortunately, the process which started March 2020 has affected all of us with all world. While a global pandemic affected the whole world, we developed our strategies by placing our organization at the center of our customers' business models. Instead of turning the crisis into an opportunity, we are trying to protect the principle of managing the process with minimum damage by supporting each other and overcoming difficulties more easily with our partners.

In this sense, we have aimed to maintain our advantageous position in the competition axis by taking concrete actions. This process also has showed us that digitalization should be at the top of our strategic plans.

We have updated and implemented all of our risk analyzes in our facility in order to ensure that the health of our employees, suppliers and business partners is important on our basic business tools, and that they are affected the most from this process.

On the other hand, we follow and try to predict the changes in dynamics around us very carefully. The change in product and service demands leads to a significant differentiation in customer expectations and needs. In the new normal, we try to adapt to these changes and show maximum care for a healthy future.

Finally, what are your thoughts on Sistem Teknik?

We believe that Sistem Teknik is one of the long-established companies that add value to our country. Since we started working, we have added a lot of value to each other in different fields professionally. For this reason, it is a brand that we always recommend giving reference to all our industrialist friends who are looking for support for industrial furnaces. For us, the most important advantages of Sistem Teknik are that it supports us to provide uninterrupted service during our working process, that it has a strong and experienced technical staff, that it provides a service network that we can reach fast solutions, and that it always supports the furnaces and systems it produces for spare parts.

> "Mehmet Ganiyusufoğlu, the founder of Korkmaz Çelik firm and our dear elder, said, "Defective heat treatment destroys the best quality steel. We are aware that even the best heat treatment cannot add much value to a poor quality steel" and we are aware that material and heat treatment technologies are always a very important denominator."

A GIANT COMPANY FROM TURKEY TO WORLD: ORAU ORHAN AUTOMOTIVE

In this issue, we are hosting a company that continues its investments despite the extraordinary conditions of the pandemic. Achieving to be one of the leading companies not only in our country but also in the world, ORAU Orhan Automotive firm deserves all the appreciation with its high technology products and customer satisfaction.

In this issue, we are hosting one of the giant brands of the automotive industry, ORAU Orhan Automotive, serving on 4 continents around the world. ORAU Metal Production Manager Gürkan Mustafa Özgür and ORAU Metal Maintenance Officer Tutku Öz have told about the successful company that provides design, development and production services at global standards. The company's cooperation with Sistem Teknik is also admirable, as it calculates every detail in every detail in the services they provide and keeps customer satisfaction at the highest level today. Finally, at the end of our interview, you will read ORAU's new year goals and good wishes.If you want, let's leave the floor to them now and listen to the story of the best company in the sector and the productivity process realized with Sistem Teknik.

Gürkan Mustafa ÖZGÜR
Orau Metal - Production Manager
Metallurgy and Material Engineer

You are one of the leading companies in the sector operating in the automotive sector. Could you briefly describe ORAU Orhan Automotive?

ORAU Orhan Automotive, engaged in the production of gears, flexible control wires, metal and springs for the automotive industry, had a closed production area of 20,000 square meters. With 1,100 employees in Turkey is one of many leading companies in their sectors. Holding an important market share in the European automotive market with its products, ORAU offers design, development and production services to its customers in 4 continents around the world at global standards. Manual gear mechanisms in 1 out of every 5 manual geared vehicles manufactured in Europe, hood and fuel wires in 1 out of every 4 vehicles, exhaust brackets in 1 out of 8 vehicles and oil dipstick in 1 out of every 6 vehicles are produced by ORAU. ORAU continues its partnership with the world's leading automotive manufacturers with its strong infrastructure and industry confidence. It continuously improves its products and production quality with the importance it attaches to customer satisfaction. You can contact us to discover ORAU quality, every detail of which is designed with technology, experience and care.

When did your cooperation and work with Sistem Teknik started?

As ORAU Metal, our cooperation with Sistem Teknik started in 2013-2014.

The "Electric Heating Protective Gas Atmosphere Brazing Furnace" purchased from Sistem Teknik has been specially designed for your needs. What is the importance of the furnace for you and can you explain its advantages?

Most products are made by combining two or more different parts. These parts can be joined to each other mechanically, as well as by welding, soldering and brazing (Brazing) methods. Former metalworkers stated that parts that cannot be combined with classical methods can be joined by filling a molten metal into the joining areas. With the widespread use of this view, studies on brazing have been increased. Brazing is a method of joining two metals together with a third filler metal. The bonding process consists of two tightly intertwined main metals and the melting temperature masterIt is realized by raising the third filler metal system, which is lower than the metals, above the melting temperature of the filler metal. Thus, the filler metal will melt and fill the gaps in the connection area of the main materials with the capillary effect. Brazing is widely used in many branches of the industry. Different brazing methods provide different usage areas. Brazed links are relatively stronger,

- High ductility
- Suitable for combining two different materials
- Combination of cast material and forged material
- Can be combined with porous parts
- Does not create surface tension

When we evaluate from this aspect, "Electric Heated Brazing Furnace with Shielding Gas Atmosphere" received from Sistem Teknik is a special process for our customer satisfaction in the meaning of in connecting the engine connection blocks of our oil level products to Renault, PSA and Tofaş models as for both quality and efficiency.

Well, what are the advantages of this choice for you?

We have gained significant advantages in terms of bringing new products to our company compared to many competitors in the world with our high quality performance and competitive process times in the oil level pipes we have sent with this process we use.

Fast and timely service support from Sistem Teknik

What kind of operations do you carry out in furnaces?

We only carry out brazing processes in Sistem Teknik furnaces.

Finally, what are your thoughts on Sistem Teknik?

First of all, I would like to express my gratitude to them on behalf of my company for their fast and timely service support, always accessible and solution-oriented approach. It is a company that is an expert in its field, and can stand behind it by answering customer special requests, especially with various types of furnace process. I think it's really hard to run with high customer satisfaction for many years. I congratulate all management and all employees separately. For us, Sistem Teknik is a partner and a solution partner rather than a supplier. I would like to thank them again and state that we hope to work for many years with a collaborative and solution-oriented approach.

WE DID IT DESPITE ALL THE CHALLENGES!

"In December 2019, while celebrating the 2020 New Year; no one could have predicted that we would have such a year. At the end of this challenging year, we first managed to survive and ensure the continuity of our business together with our employees. As we enter 2021, we hope that we will erase the negative traces of the previous year in the first quarter and catch the growth trend we left in 2019 in the following quarters. We plan and anticipate that we will carry our ORAU brand forward with our valued business partners, together with sustainable customer satisfaction. On this occasion, we, as the ORAU family, hope that the world will be a year full of health and peace, where we can work freely without worrying about work and health, where people can travel and have fun freely, and children do not worry about their education and future. "

"WE ARE COMPETING WITH TIME, NO LUXURY TO STOP"

We have listened to the successful company and cooperation with Sistem Teknik from Halil Kartal, Factory Manager of Kartal Bombe firm. Please pay attention to Kartal's words saying that they race against time and always aim for the best. This interview also reveals the secrets of being successful between the lines.

Halil KARTAL
Kartal Bombe Sanayi
Fabrika Müdürü

A new year is waiting for us. In this New Year, when new excitements, new investments and brand new projects will start, it will be a year in which companies that do not stop and win by working hard even in the most difficult conditions will rise. Here is one of these companies, which has been serving the Turkish industry since 1945. It is Kartal Bombe. Factory Manager of the successful company specialized in metal forming, Halil Kartal says, "We are racing with time, we do not have the luxury of stopping," and adds: "After the pandemic, new opportunities will be waiting for everyone". In our interview, Kartal also has touched on the cooperation with Sistem Teknik. "We see productions where local and national steps gain speed. "One of the invisible heroes of those productions is Sistem Teknik." Between the lines of our interview, there are tips for our readers who want to be successful.

Can we get brief information about Kartal Bombe Industry (KBS), one of the leading companies in the heavy industry sector, and its production?

Kartal Bombe, whose foundations were laid in 1945, is today a corporate and global organization specialized in metal forming. Although camber manufacturing is our main business, we are doing project-based productions such as turnkey spherical tank manufacturing and pressure equipment manufacturing. We carry out our production in 2 different locations, Dilovası OSB and Dilovası Imes OSB.

So, when did your cooperation and work with Sistem Teknik start?

In 2006, Sistem Teknik made the manufacture of our car-based heat treatment furnace. Our cooperation started at that time. I can say that the oven is still today one of the largest bakery in Turkey. That it is 17 meters tall, 7 meters wide and 7 meters high. I would also like to state

that the owners of the two companies devote time for the industry of our country in various fields, especially Kocaeli Chamber of Industry. The friendship of Mehmet Özdeşlik and KBS Chairman Mehmet Ali Kartal goes back to many years. Today, we have changed the roles with Sistem Teknik. They are our customers right now, we are working as their supplier. I would like to point out that Sistem Teknik is really a great value for this country with its corporate culture and its productions.

The furnace you bought from Sistem Teknik is specially designed for your needs, has large dimensions, and runs outdoors outside the factory. Could you tell us about the importance and advantages of the furnace for you?

We can apply heat treatment to our customers' products as well as to the products we manufacture. This furnace we are talking about is important not only for KBS but also for many other companies. Therefore, we do not have the luxury to stop. The 100 ton capacity of our furnace is a great advantage for us. Apart from that, gas consumption and robust construction are also very important factors. On the other hand, the constant heating and cooling of an oven due to its being in an open area were among the factors that could cause problems. But we thankfully did not have such problems.

"Sistem Teknik is a global actor that has proven itself in its field"

What did you get from choosing Sistem Teknik?

The most important thing for us is that the production does not stop. We do not have the luxury to explain otherwise to customers. In a period when we are racing against time, our machines must also keep up with us. I can say that this choice has brought us this. There may be mistakes or good sides in every brand model product. But the important thing is to fulfill its duty as a whole. Our furnace has been making us happy in this sense for about 14 years. In addition, using known and proven brands can come back to you as a positive return for customers. Today, Sistem Teknik is a global actor that has proven itself in its field.

2021, NEW YEAR AND NEW OPPURTINITIES FOR EVERYONE

Kartal Bombe Factory Manager Halil Kartal explained his predictions and expectations for 2021 with the following words: "First of all, we wish the pandemic to end as soon as possible. Apart from the economic dimensions, it gave us a hard time as human being demands and requirements. Despite the pandemic in 2020, we cannot say that it is not very bad for us in terms of sales figures. But from time to time, we experienced a decrease in spirits compared to the previous years. It seems that the pandemic conditions will extend to minimum of spring or summer. After the pandemic, new habits and new opportunities will be waiting for everyone. "

What kind of operations do you do in your furnaces?

We use our furnace to perform stress relief annealing to a great extent. Apart from that, we can use it for recrystallization, spheronization annealing and normalization. In fact, we try to meet customer demand and the requirements of international standards within the parameters that the furnace can operate.

Finally, what are your thoughts on Sistem Teknik?

First of all, congratulations to Sistem Teknik for its projects. Today, we see productions where domestic and national steps accelerate. Here, Sistem Teknik is one of the invisible heroes of those productions. For example, another project we carried out together was a project for TEI. Today, we have another project to be made for Roketsan company. As I have mentioned above, it is a good example in the field that has a culture and represents this country in the global market.

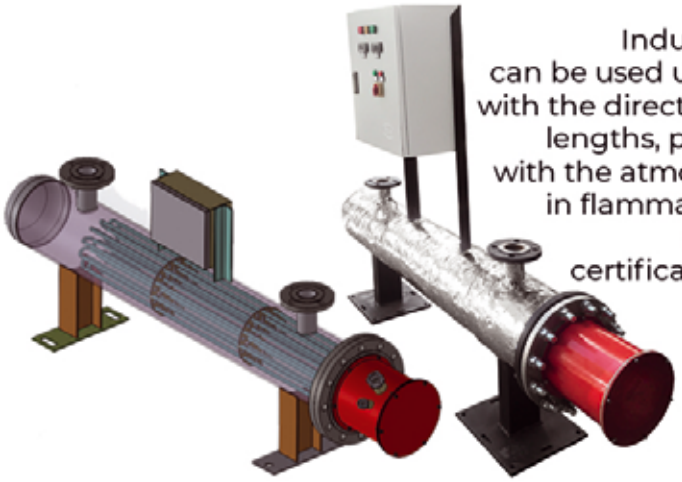
Baykal Rezistans
1970
www.baykalrezistans.com

Turkey's number one manufacturer of industrial heating elements

INDUSTRIAL TUBULAR HEATERS

Tubular Heating Elements, for a wide variety of purposes can be used. Most used areas; heating water, oil, chemical and corrosive liquids, to heat up of heat treatment furnaces, heating of molds and special metals. These type of heating elements can be produced in different diameters. Standard Diameter Sizes; 6.5mm -8.5mm-11.5mm-14.5 mm-16.00 mm. Apart from these, special diameter from 5 mm to 20 mm as production every intermediate size can be produced easily. The tubular heaters we produce are today's technological operating temperature of 650°C can show up to the performance.

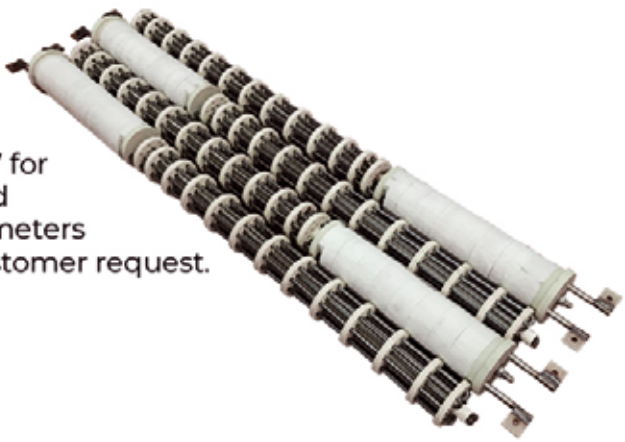
INDUSTRIAL HEAT EXCHANGERS



Industrial heat exchangers with electrical heating elements can be used up to 750°C for to heating of every type of liquid and gas with the direction of high technology. Usually can be used in different lengths, power and diameters. It can be produced in accordance with the atmospheres. This kind of heating systems also can be used in flammable, explosive environments. For your such requests we are able to produce exproof heating systems with ATEX certification. Will be able to meet all future demands regarding this system we have the knowledge and equipment.

INDUSTRIAL FURNACE HEATERS

Baykal Rezistans is producing tube protected ceramic supported heating elements for high temperature furnace operations. The strategy for this type of heaters, maximum power in short length with maximum life span. Tube protected ceramic supported heaters can be loaded 40kW for per meter. This type of heaters can be used in vertically and horizontally. This heaters can be produced in different diameters and lengths with high watt density in accordance with customer request.



Baykal Rezistans
1970

50
YEARS EXPERİENCE

Number One Manufacturer Of Industrial Heating Elements In Turkey

Since 1970, Baykal Rezistans is serving unlimited and excellent services to his customers. Now, our company is just producing industrial heating element for his special customers.Baykal Rezistans in additon to production of industrial heating elements, also well known and reputable stockholder for raw materials of electrical heating elements. Baykal Rezistans presents high level engineering services to approximately ten thousand customers all around the world, with boutique and customer based exclusive service philosopy.

satis@baykalrezistans.com export@baykalrezistans.com +90 212 244 52 13 (pbx) www.baykalrezistans.com
İkitelli Org. San. Bölg. Eskoop San. Sit. C1 Blok No:16-18-20 Başakşehir/İSTANBUL /baykalrezistans

WE ARE NOT AFRAID OF TREACHEROUS LEAK?

Do you know that you can detect leaks in the most sensitive areas with helium detectors? That's why we have entitled this article as "We are not afraid of treacherous leaks?". We have marked three types of helium detectors for you.

There are several headings in vacuum systems that affect the total pressure of the system. These are expressed as permeability, virtual leaks, real leaks, gas emissions, back evaporation, pumping speeds, and design measures, etc. Total leakage and total pumping rate are used to get clear information about the systeam. Some of the general performance improvements in vacuum systems are made through leak tests. Helium detectors offer some very useful advantages at this stage.

Helium detectors are essentially mass spectrometers and they are only sensitive to helium. For this reason, they are expressed as a device that can take very sensitive measurements and thus show us even the leaks in the most sensitive areas.

In fact, "Everything leaks" motto is the secret. What matters is our acceptance values, because with a helium detector, we can measure even 1 cc of helium leak in almost 30 thousand years. This would be an extremely delicate value for a white goods manufacturer and would greatly increase their costs. However, for a pacemaker manufacturer, it is impossible to say the same, as it will directly affect human health. There are three main types of helium detectors in the Agilent product range.

1- Portable Helium Detector –
PHD-4 is a device that can test with its battery-powered structure that allows mobile use and the most sensitive sniffing method in the world. It is very often used to locate leaks in some underground storage and pipelines. Imagine that you have meters or even kilometers of underground lines and finding where there is a leak in that line is not even a job for this device. Because it is battery powered, you can work in any open field how you want. The battery, which will allow you to work continuously for up to 4 hours, is long-lasting and can be recharged. There is a reason why its sensitivity is limited to the highest point that can be reached with sniffer mode: ion pumps which are vacuumed to the level of e-6 mbar and placed in a sealed chamber. When this chamber is heated up to 400 degrees with a special filter, helium passing through a filter through which only helium can pass directly reaches the ion pump and allows it to draw current. The amount of current measures how much helium is exposed and measures the amount of leakage on the screen in terms of PPM, mbarl / s, atmcc / s, Pam3 / s or gr / year.
It is a device that can get results very quickly in the tests of reactors, fuel tanks, liquid tanks, hydraulic lines, hydraulic or pneumatic components operating with the principle of equal pressure.

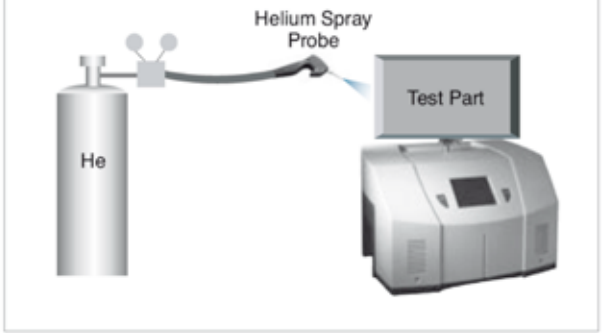
- Multifunctional Leak Detector

2- C15 Component helium detector -
Some tests require a determination that needs to be measured metrologically and, based on the results, the product should be shipped or subjected to recycling or recovery procedures. These kind measurements can be made with a system where atmospheric conditions do not affect the measurement accuracy. This is exactly possible with the use of helium. Helium gas is rarely found in free form in nature. 5 ppm does not react due to its inertness. It is harmless to human health and nature, it is an inert gas with the smallest known molecular size. With all these features, the use of these gas test methods is also extremely safe. The tests performed are not affected by the ambient temperature and the amount of humidity in the environment. When the C15 is coupled with the necessary systems, we can test and approve hundreds of engine blocks, aluminum rims, air conditioning compressors, airbag units, fuel tanks, brake pipes and similar products per day and ship our products safely.

3- HLD Programmable Detector
If you have this type of detector, it means you have almost no problems. The device offers many different application options with its additional accessories. Moreover, you do not need to make long programs for different applications.
It is precise, durable and easy to use. With six different usage modes, you can quickly make the application whichever you want and get very fast results.

Portable Sniffer

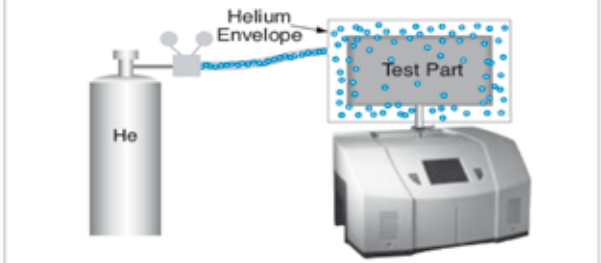
Figure 1 - Locating Leaks – Outside-in



a- Out side - in (for area detection)

While the chamber is vacuumed in tests to be carried out with this method, the detector is connected to the vacuum line with the help of a hose. The device is started, we can start our scans with the helium spray hose we have. In the meantime, we can choose whether our device displays a graphic or value.

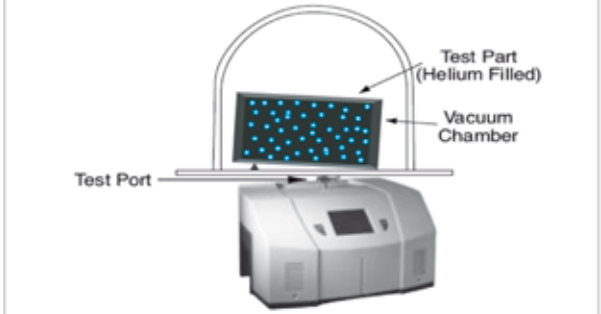
Figure 2 - Measuring Leaks – Outside-In



b- Out side - in (for measurement)

With this method, the product concentration is placed in a specific helium environment and the test is started. Although it is not clear where it is from, if a certain amount of helium reaches the product, this amount is measured and the leakage amount is determined.

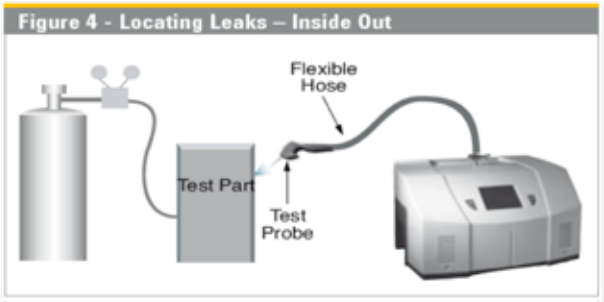
Figure 3 - Measuring Leaks Inside-out



c- Inside-out (for measurement)

With this method, the product is filled with helium, then placed in an empty chamber. The cabin is scanned with a detector to see how much helium is encountered. With this value, the leakage amount of the product is determined.

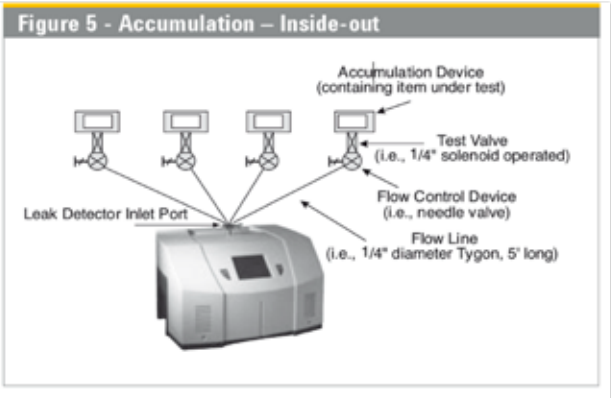
Figure 4 - Locating Leaks – Inside Out



d- Inside-out (for zone detection)

To pinpoint (but not to measure) the location of the leaks, the total leak is scanned using a Sniffer Probe connected to the inlet of the part for possible potential leak locations.

Figure 5 - Accumulation – Inside-out



e- Inside-out Accumulation

This method can both find and measure leaks. One type of cover is placed to wrap around a cap, a specific time defined to allow for potential leak location. If there is a leak in the part, the helium concentration in the closed area will increase. The leak detector is connected to these volumes with valves, one by one or all at once.

toRRvaC
TORRVAC MÜHENDİSLİK YÜKSEK VAKUM SİS. SAN. VE DIŞ TİC. A.Ş.

ULVAC **QULEE** GAZ ANALİZÖRÜ

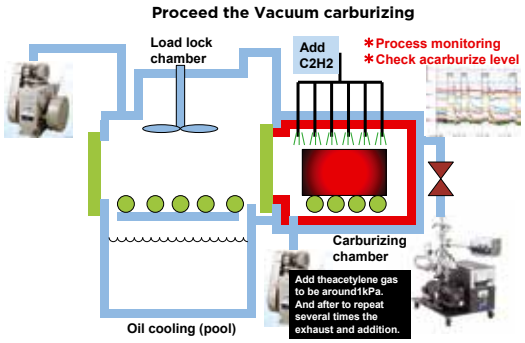
Since its establishment in 1952, ULVAC (ULtimate in VACuum) has been committed to the advancement of vacuum processing technology. ULVAC is an international company that designs, manufactures and markets equipment and materials for industrial applications of vacuum techniques and technology. ULVAC products include dry type vacuum pumps, mechanical booster pumps, diffusion pumps, high vacuum valves, gas analyzers, leak detectors and surface profile measurement systems.

Gas Analyzers usage purposes
It is used to determine flammable gas as a percentage in fire, hazardous industries.

Qulee Basic Gas Monitor
"Qulee" (pronounced "KLEE") is ULVAC's latest model for residual gas analysis. Feedback from plant engineers on various production lines has been greatly enhanced by incorporating it into the new product design. The most suitable result has been achieved for the system control of vacuum evaporators and various types of vacuum furnaces.

Vacuum Carburizing Furnace Qulee Advantages

- The system provides leakage control.
- Guarantees the stability and repeatability of the system performance.
- Manages the oxygen concentration during carburizing.
- It secures the surface brightness of the products.
- Detects the effective carburization time and optimizes the time.
- It prevents metal deterioration due to the long heating period.
- Detects the end of the carburization on process.
- It minimizes process gas consumption. (C_2 H_2)
- Detects foreign gases remaining in the system.
- It determines the amount of H_2O and Hydrocarbons formed in the system.



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KARTAL BOMBE INDUSTRY (KBS) COMBINES YEARS OF TEACHING WITH ITS INNOVATIVE TECHNOLOGY

In this issue of Furnace News, we host Kartal Bombe Sanayi, which has a deep-rooted history and combines the present with its past values and achievements with new technology.

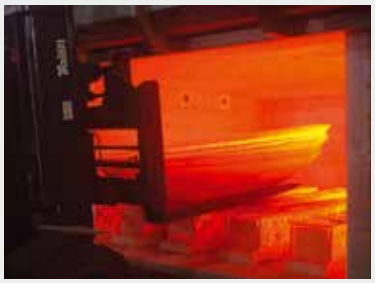
Kartal Bombe Industry Factory Manager Halil Kartal gives the following explanation about the works carried out within the company: “As Kartal Bombe Industry (KBS), we have existed since 1945 in every field that needs dome and shaped parts, especially pressure vessels. Today, in the need to shape a product in almost all Turkey, the KBS brand is recommended, because it is known with its capacity and experience. Stating that they always prioritize customer expectations as a company, Kartal has emphasized that they are today's KBS in line with the demands of the customers and said, “Sometimes we bought a new machine, although it was not in our product range, we made production in different business lines because our customers demanded. One of them was the production we made for a project of İçdaş Çelik. You can think of this production as an elliptical camber, but we are talking about a huge dome with a thickness of 40 mm and a diameter of 8680 mm on one side and 10234 mm on the other. Of course, it is impossible to manufacture this from a single piece. We manufactured this camber using the method we call multi-piece manufacturing. By doing what has not been done in the sector until now, we have both saved a lot of time and achieved a significant increase in product quality.

Halil KARTAL
Kartal Bombe Sanayi Fabrika Müdürü

In the productions made before us, the slices that came to the edges of the dome were also divided into slices and assembled, we followed a different way here. With the possibilities we have, we have developed a method that would press this area in one go, and we have done what has not been done until today. As a result, everyone, especially the Icdas Celik officials, have expressed their satisfaction and made us happy". KBS deserves great praise for their contribution to the Turkish industry. Stating that we are fully confident that KBS will continue this success, we are happy to include the following words of Halil Kartal: “As KBS, we put our name in every work we do and we use all the means we have in order not to be embarrassed to anyone. Today we can shape 200 millimeters with hot pressure in Turkey, it can bump into a hot press as one piece with a diameter of 2600 mm. We thank all our customers who trust us.

KBS
Kartal Bombe Sanayi

DOUBLE WALL VACUUM TANK



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Tuzla Branch
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FOLLOW US...

CO_2 traffic light from WERMA Signaltechnik

Install the traffic light

- no higher than 2 m above the floor
- not directly on the window

Traffic light set for climate monitoring in enclosed spaces

Given the current coronavirus pandemic, we are in an unprecedented, exceptional situation. The current situation is changing our lives in all aspects and we face new challenges every day. People's health and protection are a top priority.

For this reason, the Government and companies are constantly looking for new ways to halt the global pandemic and to meet constantly changing conditions. WERMA Signaltechnik is making an important contribution to the climate with its new CO_2 traffic light. With this traffic light, the current carbon dioxide concentration can be measured in the ambient air and displayed clearly using the three traffic light colours.

This means that a high concentration of carbon dioxide and aerosols in the ambient air can be avoided in all public buildings, restaurants, shops, doctor's practices, universities, schools or open-plan offices.

Since carbon dioxide is distributed fairly evenly throughout the room, one traffic light is usually sufficient for rooms like a classroom. Rooms the size of a gymnasium should be equipped with two traffic lights.

> 2,000 ppm*
If the traffic light is red, it is urgently necessary to ventilate the room until the traffic light turns green again.

At a concentration of **>3,000 ppm***, the traffic light flashes red to indicate that there is now a danger to health.

>1,000 - 2,000 ppm*

If the traffic light is yellow, the room should be ventilated.

<=1,000 ppm*

If the traffic light is green, there is no need to ventilate the room.

* ppm = parts per million, i.e. volume parts per million volume parts

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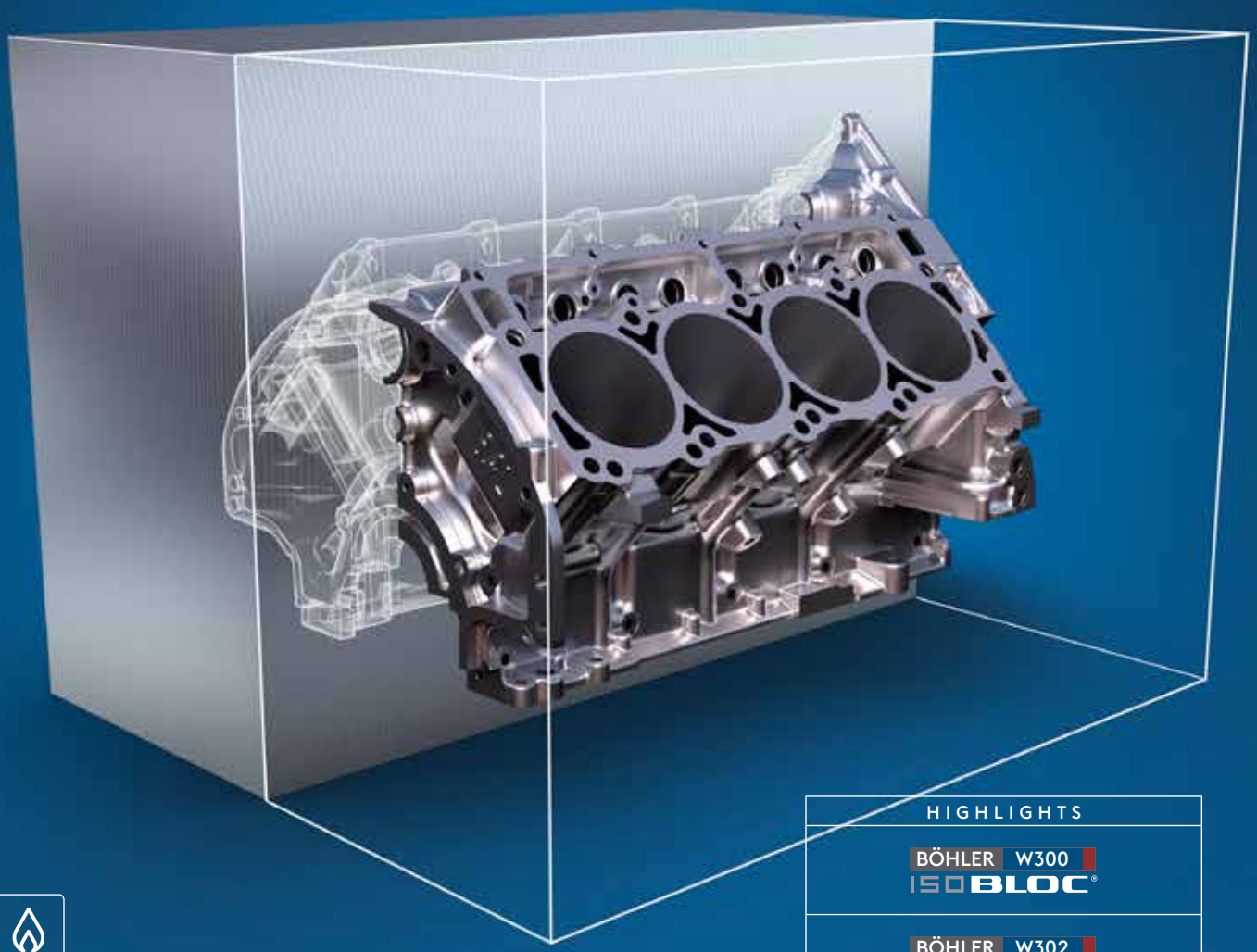

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