SISTEM TEKNIK ISSUE
APRIL-MAY-JUNE 2021 ISSUE 4

INDUSTRIAL FURNACES

TECHNOLOGY NEWS

"HELLO" TO DIGITAL TRANSFORMATION

SİSTEM TEKNİK ON THE JOURNEY OF DIGITAL TRANSFORMATION...

Dear Readers,

In order to communicate better with you, we published the first issue of our magazine in July 2020, under the conditions of the new type of Corona Virus epidemic that left its mark on 2020 and put the whole world in great uncertainty.

In our first issue, I mentioned that there is a great uncertainty ahead of us, the process will be difficult, but every challenge will create new opportunities, and it will trigger big changes.

During this period, some time completely shut down of the company, international travel restrictions, create new type of working. Although many difficulties I mentined, On-line working trials, new type of working organisations created new opportunities and reduce some fixed costs.

We did our erections with better planning with very few personnel, we tried to establish the lean culture by filling the times we could not work with on-line trainings, we started the digital transformation in the company.

Thanks to the diligent work of our employees and the trust of our customers, our asset size increased by around 30% in TL in 2020, and our export rate was 73%. We aim to continue the same success in 2021. I would like to briefly talk about what we have done in terms of digital conversion in this process. First of all, with the consultancy of my dear teacher, my dear friend Dr. Lütfi Apillioğlu, we started the lean transformation, which is an indispensable part of digital transformation.

By demolishing the walls between the departments in our factory, we eliminated the silo logic in our company. We have taken very important steps in terms of reducing our costs by reducing waste in every area, we invested in a warehouse system that can integrate into a digital system that makes vertical storage instead of our manual warehouse system that covers a lot of space, we got rid of unnecessary stocks. In the name of digitalization in production, we started to use our Product Data Management (PDM) system more effectively, we invested in the Project Management System MANAGE software, which can be integrated into our design system.

When the integration is completed, we will be able to plan our workflows much more effectively, track real-time engineering studies and project revisions, and make significant improvements in our delivery times.

I would like to thank Armada company, which made us come a long way in the adaptation of MANAGE software to our company in a short time.

The aim of these works is to be the first company that comes to mind on a global basis, keeping our quality at the highest level, fast in delivery, advantageous in price, flexible response to customer needs.

Even under pandemic conditions, we can see that we have progressed a lot in this matter by taking new orders from customers we have never visited from abroad, and I thank our very valuable customers for recommending us.

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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**

EXPERIMENTAL AND NUMERICAL INVESTIGATION OF MOLTEN SALT BATH QUENCHING AND EVALUATION OF THE HEAT TRANSFER COEFFICIENT

Alper Keleşoğlu, Levent Sindel, Cengiz Zafer, Gökhan Lale,
Mehmet Özdeşlik, Ümit Ünver

Abstract

Molten salt baths are widely using in the heat treatment industry. Considering the martempering and austempering applications in this field, molten salts are the most reliable technique for quenching applications in order to get homogenous microstructure and fine grains. On the other hand, new aviation steels require certain cooling rates in quenching process. In this work, the quenching process of Ni based superalloy is investigated under different molten salt bath temperatures. Cooling curves are obtained by the experiments and the numerical analysis is done to determine the heat transfer coefficient during the process. The results showed that the cooling rate is decreasing with increasing salt bath temperature. Also, heat transfer coefficient is found as a single constant value for all molten salt bath temperatures and in the range of the values which is implied in the literature.

1. Introduction

Regarding to the rapid development in aviation industry, the components of the system requires high temperature and pressure endurance during its service life. For this reason, thermo-physical properties and the creep-rupture characteristics of the components strongly depend on the microstructure of the alloy [1]. In order to achieve precise controlling of the process, fine grains, and homogenous microstructure, the selection of the heat treatment method is important [2]. For several applications, Ni-based superalloys are emphasised as solution annealed and precipitation hardened. The Inconel grades of the Ni-based superalloys are hardened with the precipitation of the gamma prime and carbides as a secondary phase inside the metal matrix. The precipitation of the secondary phases (mainly aluminium, niobium and titanium) are occurred between the temperature range of 600-700°C [3]. For a single-crystal superalloy, the recipe for the quenching process after solution treating generally done in the air. This process takes a lot of time when air is used as a quenching agent. For this reason, vacuum furnaces are using to reduce the quenching time by using pressurized argon or nitrogen. However, the process cost is very high when using vacuum furnaces. Here, molten salt quenching is an emerging technology that can be used in the secondary phase precipitation application after solution treating of the Ni-based superalloy. Molten salt baths are widely using in high temperature quenching applications such as martempering, austempering. In this process, the critical cooling rates of the material from 1150°C to 950°C and 950°C to 750°C are determined as 125°C/min and 120°C/min, respectively [1]. The important factors which have strong effect on the cooling rate of the steel are the oxidation level with the condition of the workpiece surface, geometric complexity and the mass of the workpiece with the agitation of the quenching medium [4]. In this paper, the cooling characteristics of the superalloy hollow disk is investigated under different molten salt bath temperatures. The temperature values of different locations on the hollow disk are measured in order to define the cooling rate. Then the numerical analysis is done to determine the

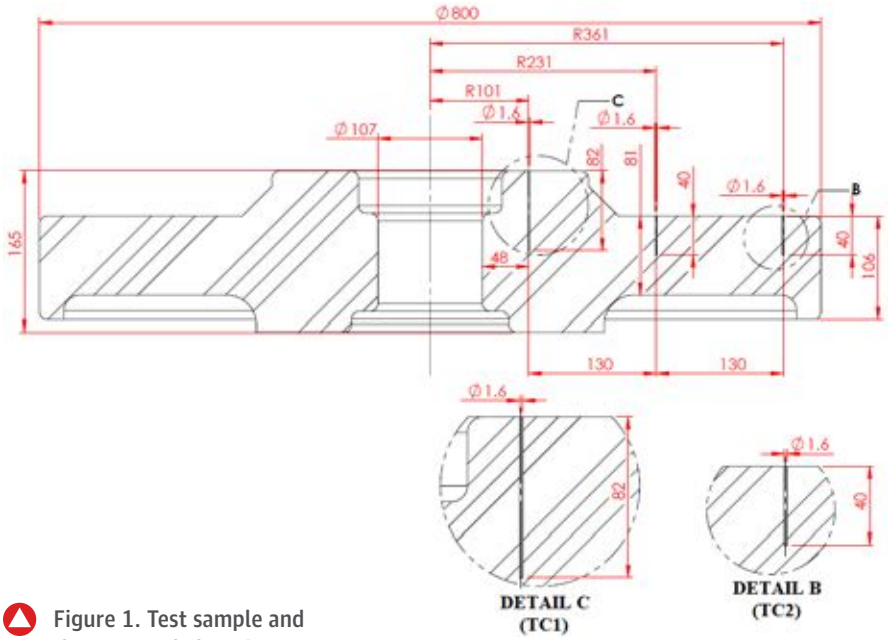

Figure 1. Test sample and thermocouple locations.

heat transfer coefficient during the quenching process.

2. Materials and Methods

2.1 Material

The experimental work was conducted by using a Ni-based superalloy hollow disk as a workpiece. In order to record the workpiece temperature, two N-type thermocouples (TC) were mounted on the disk. The dimensions of the hollow disk and the TC locations is illustrated in Fig.1.

2.2. Experimental procedure

The experimental work was done by the facility that developed and manufactured by Sistem Teknik (Model no: BF-EH-A-100907-08) as shown in Fig.2.

- 1:The facility consists of mainly six components and the numbers on the Fig.2 and Fig.3 represents;
- 1: Heating Furnace,
- 2: High temperature molten salt bath,
- 3: Low temperature molten salt bath,
- 4: Spare molten salt bath,
- 5: Manipulator and
- 6: Salt recovery unit.

In the experiments, the hollow disk was heated to 1150°C in 3 hours in the heating furnace. Then, it was discharged from the furnace and transferred to the high temperature molten salt bath which has a capacity of 5.7 m3 via gripper mechanism. The transfer time of the hollow disk was kept as low as possible, between 5-10 s in order to minimize the heat losses through the atmosphere. On behalf of to improve the heat transfer between the molten salt and the hollow disk by agitation, two circulators were activated when the hollow disk is immersed to the tank. The cooling performance of the hollow disk inside the molten salt bath which has a rough composition like %50 NaNO3 and %50 KNO3 was obtained by recording TC1 and TC2 temperature values via datalogger.

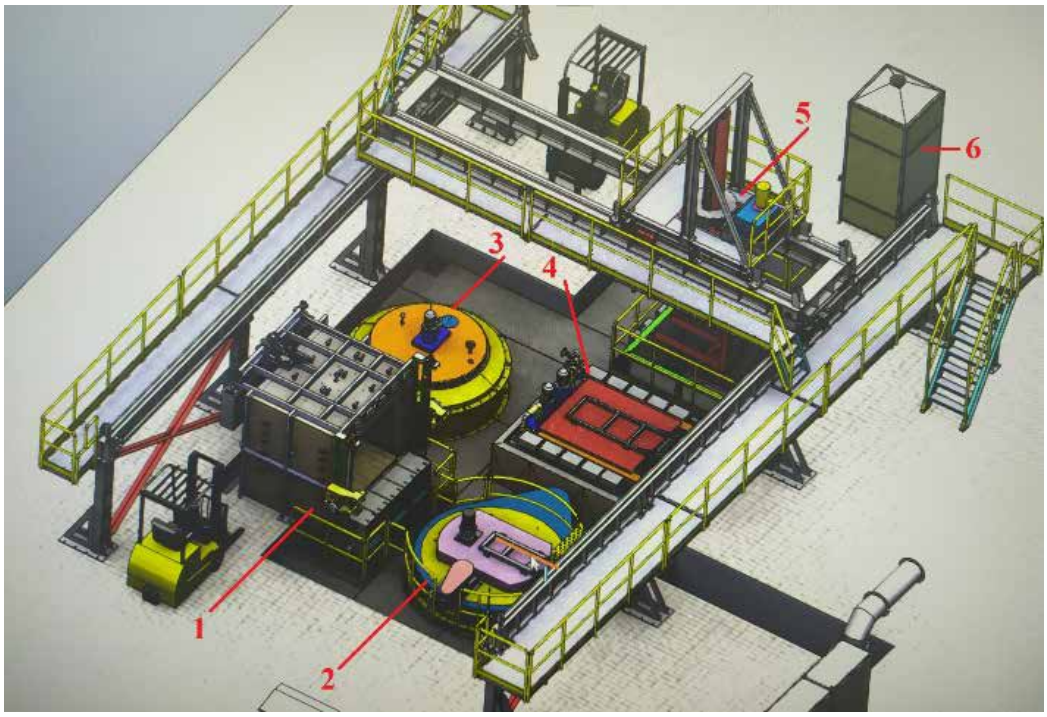

Figure 2. Experimental facility.

The tests were conducted considering three different molten salt bath temperatures. The bath temperatures were selected as 300°C, 400°C and 500°C considering the maximum operation temperature of the molten salt [5].

2.3. Numerical procedure

Numerical analysis was done by using commercial simulation program Fluent to determine the heat transfer coefficients while the hollow disk is cooling in the molten salt bath. For this purpose, the geometry of the disk is imported to the program and the arbitrary heat transfer coefficient of the molten salt medium which was related with the literature was defined to the exterior boundaries of the geometry [4]. In order to determine the heat transfer coefficients, the inverse method was used as explained in the literature [2]. On the other hand, the evaluation of the actual heat transfer coefficient of the medium was determined by achieving the same temperature curve for each molten salt bath temperature as measured in the experiments.

3. Results and Discussion

Fig.3 shows the transportation of the heated hollow disk from the heating furnace to the high temperature salt bath during the experiments. The thermal image of the same position is given in Fig.4. From Fig.4, it can be seen that the maximum temperature is gathered from the hollow disk surface. This is meaningful when we considered the emissivity of the thermal camera is defined for the steel as 0,8 not for the ceramic fiber inside the heating furnace. This causes a lower temperature for ceramic fibres, thus the temperature value of inside the heating furnace seems lower than the workpiece.

Figure 3. Transportation of the hollow disk.

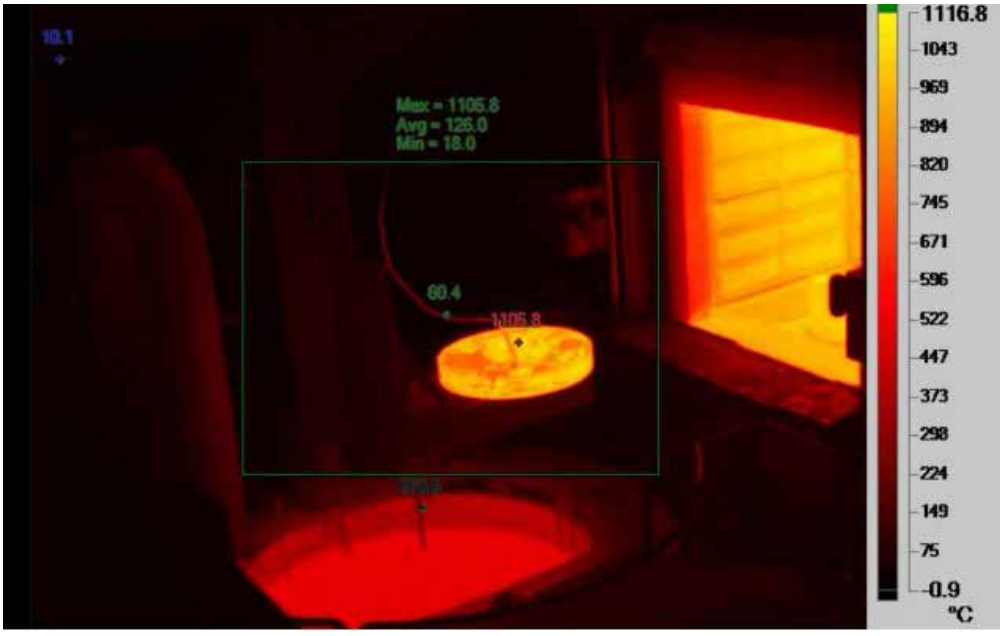

Figure 4. Thermal image of the transportation process.

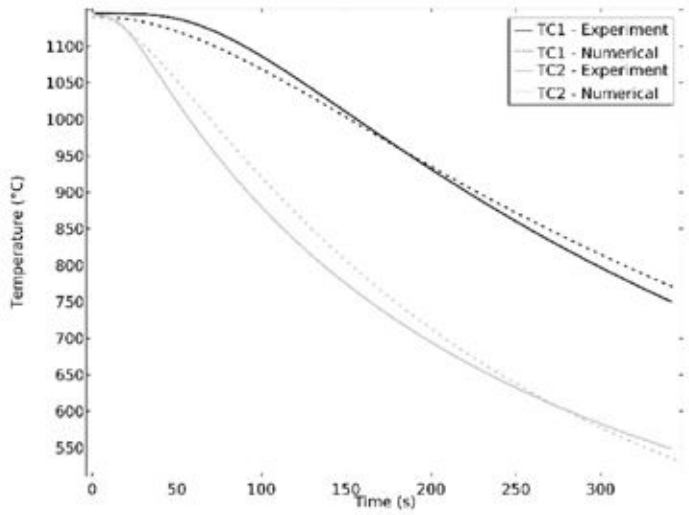

Figure 5. Time-temperature curves of workpiece for 300°C salt bath temperature.

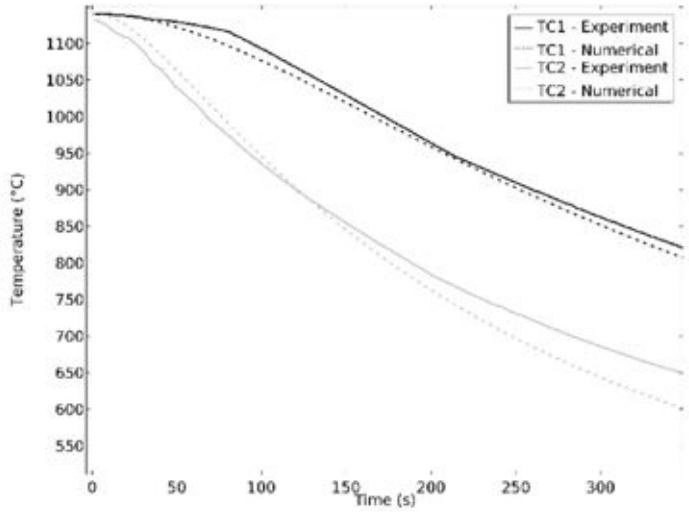

Figure 6. Time-temperature curves of workpiece for 400°C salt bath temperature.

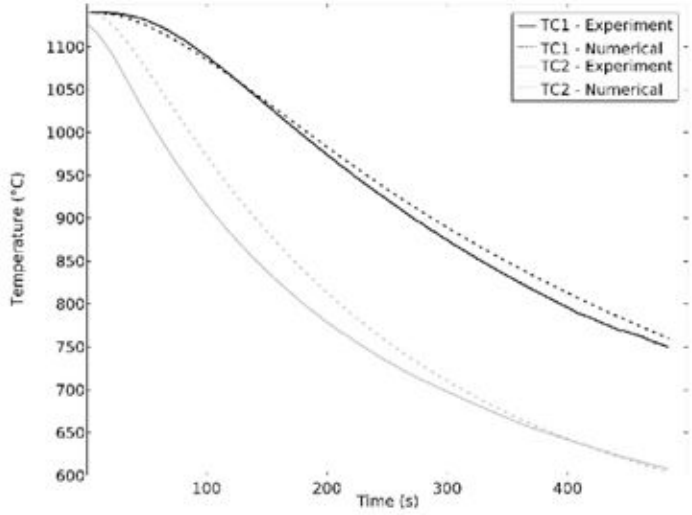

Figure 7. Time-temperature curves of workpiece for 500°C salt bath temperature.

Fig.5, Fig.6 and Fig.7 shows the temperature change of the workpiece under different salt bath temperature with regard to time elapsed. It can be seen from the Fig.5, Fig.6 and Fig.7 that the difference between experimental and numerical values are relatively close and it is in the acceptable limit for such applications. For this work the heat transfer coefficient is evaluated as 650 W/ m2K regardless from the salt bath temperature. This indicates that the cooling rate of workpiece can be realized under different temperatures other than examined in the experiments.

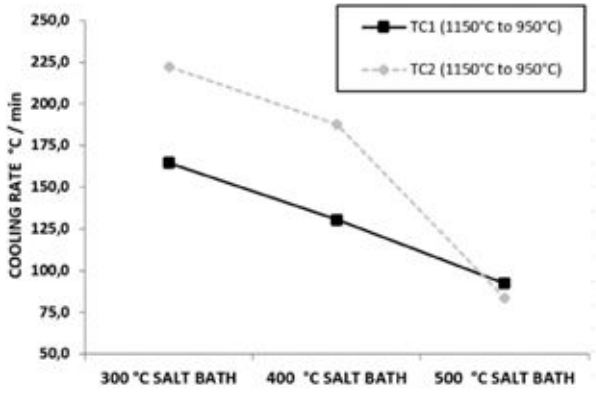

Figure 8. Cooling rate of workpiece between 1150°C to 950°C with changing salt bath temperature.

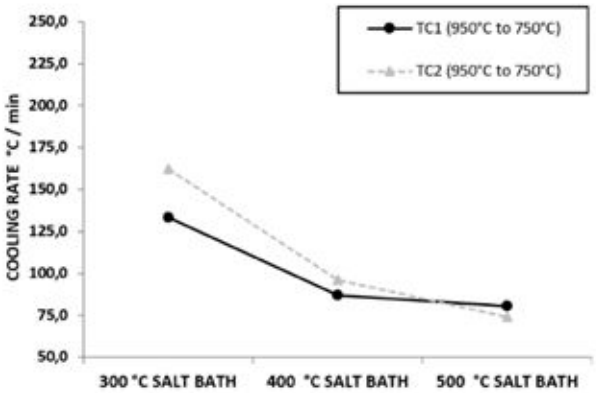

Figure 9. Cooling rate of workpiece between 950°C to 750°C with changing salt bath temperature.

From Fig.8 and Fig.9, it can be seen that the cooling rate of the workpiece is decreasing against the increasing salt bath temperature. This is caused by the decreased temperature difference between workpiece and molten salt. On the other hand, the cooling rate difference between two locations on the workpiece also decreases with increasing temperature. This can be explained by the decreasing cooling effect of the salt bath. The convective heat transfer reduces with increasing salt bath temperature and it causes a relatively low cooling rate difference between two locations on the workpiece. The experimental work showed that the critical cooling rate could not be achieved when the molten salt temperature equals to 500°C. In order to make the heat treatment correctly, the molten salt temperature should be lower than that value.

4. Conclusion

In this work, the molten salt bath quenching of superalloy steel is investigated experimentally and numerically. The results showed that the cooling rate decreases with increasing salt bath temperature. It is found that the critical cooling rates to cool the material cannot be reached when the salt bath temperature is 500°C. Also, it is observed that the experimental and numerical values are in good agreement. From this point, the heat transfer coefficient evaluated as 650 W/ m2K.

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SİSTEM TEKNİK
SANAYİ FIRINLARI A.Ş

WHAT IS BRAZING?

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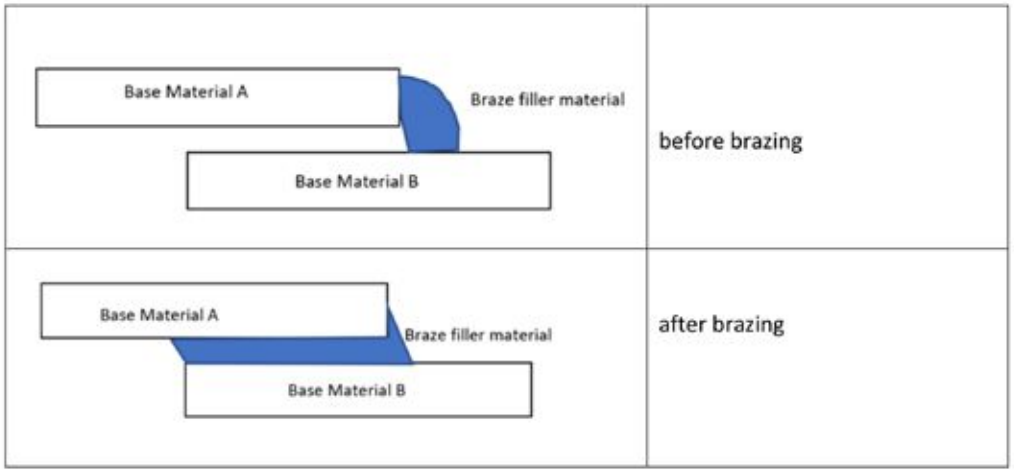
Test engineering Technical Management Unit

Brazing is a metal-joining process in which two or more metal items are joined together by melting and flowing a filler metal into the joint, with the filler metal having a lower melting point than the adjoining metal.
During brazing, the items to be joined are temporarily attached to each other by using a fixture or tack welding, then the braze alloy, selected per the material of the parts, is applied on one side of the joint then the alloy is heated to a temperature which is higher than its melting point and lower than the melting points of the items to be joined. Melted alloy flows thru the joint by capillary action and fills the gap. During this cycle, molten braze alloy slightly diffuses to the both side of the joint thus creates a very strong bonding.
Braze filler material may be in the form of powder, slurry, foil, wire or tape depending on the material type, geometry or the joining method to be used.

What are the main brazing techniques?

The brazing has several application methods depending on the heat source to be used to melt the braze filler material. The main brazing methods are given below;
• Furnace brazing; The heat required to melt the braze filler material is supplied by the heat generated inside the furnace or oven. The parts are brazed under vacuum condition or under protective atmosphere to prevent theoxidizing effect of the air atmospehere.
• Gas torch brazing; the heat is obtained from the flame generated by the oxyacetilen gasses. flux type material is used to prevent the braze filler material from the oxidizing air.
• Induction brazing; The heat is provided by the electromagnetic field that is created by the alternating current from an induction coil. flux type material is used to prevent the braze filler material from the oxidizing air.
• Electric arc brazing; the heat is provided by the electrical arcing using a power source the molten braze filler material is protected by the shielding gas (argon or helium) and/or a flux from the oxidizing effect of the air..



Pic 1- A schmatic demonstration of the typical braze flow

What are the main advantages of brazing compared with the other types of conventional welding methods?

During the conventional welding methods, the main parts are melted and solidifes to complete the joining, but in these areas of the part (where some portion ofthe metals are melted and solidifed) some of the metallurgical and mecahnical properties (like tensile strength) are lost or decreased even if the post heat treatment is performed. During brazing, the main metals are not melted so there will be no reduction in any of the metallurgical/ mechanical properties. With conventional welding trechniques, geometrical deformation is the major risk for very thin parts but with brazing technique, very thin parts up to 0.06 mm can be joined together without any deformation. Another important advantages of brazing are, metals with different thicknesses (very thin and very thick parts) and metals with different material type (like steel and superalloys) can be brazed successfully.

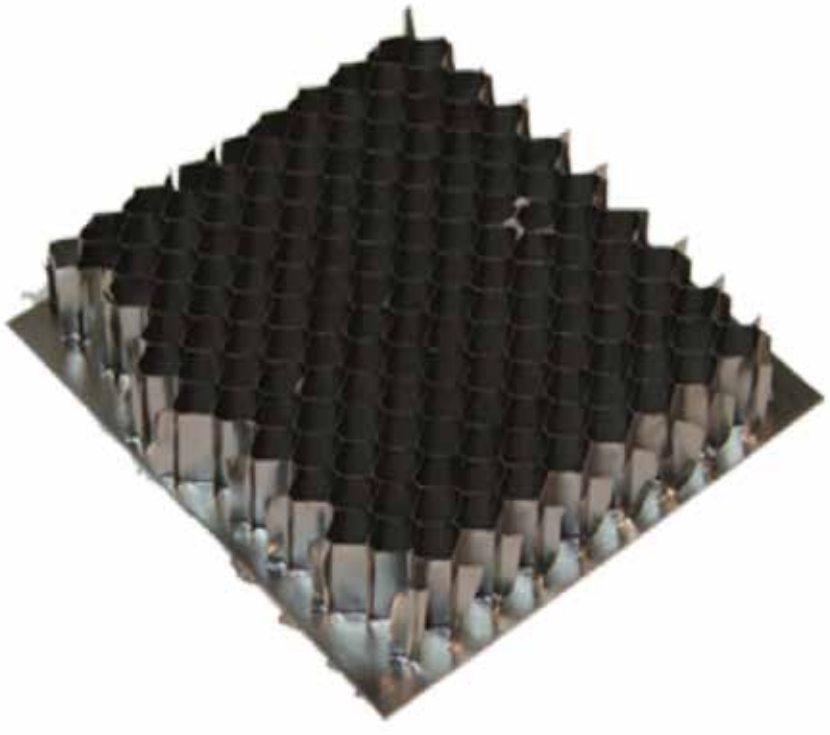
What are the critical steps in brazing process?

The major critical points in brazing process are given below;

- Cleanliness of the parts to be brazed and cleanliness of the environment,
- Surface condition of the surfaces to be brazed,
- The gap (clearance) between the parts to be brazed,
- Selection of the right braze filler material type and form depending on the main metal type,
- Selection of the right method and protective environment

What is thegeneral application of brazing in aviation industry?

In aviation industry, vacuum furnace brazing is used widely on many components of airplane and helicopter engines. The new engine models are working at higher RPM's and with higher work temperatures so the use of ceramic based materials are extremely increasing, and vacuum brazing is also being used on the joining of the ceramic based materials. The brazing is also used for repairing microcracks observed on the turbine components . The honeycomb materials are also bondeedd to the base metal with brazing method.



Pic 2- Honeycomb materials.

SYSTEM TECHNICAL CATALOG AND LIBRARY STUDIES

As Sistem Teknik, our goal is; To advance our work that has become more standardized, optimized production costs, and provides ease of maintenance and service. In line with this goal, we focus on our work with our devoted team and continue to add innovations to the ST Library.

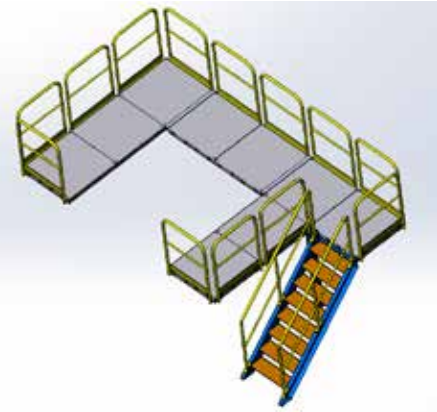
The global production quality is improving with developing technology. This situation has made it necessary to continuosly developing our improvements for the projects and the production speed. As a Sistem Teknik Industrial Furnaces, we established a new department with a strong team in 2020 by aiming to improve our processes without slowing down with standardization and digitalization studies.
In order to increase the speed and efficiency of our processes, the foundation of the System Technical Catalog studies has been laid. As a result of the simultaneous engineering studies of our newly formed department, the ST Catalog stuides are continously shaping and its product range are increasing. Our goal is to reach, more standardized, more optimized production costs, ease of maintenance and service, and making our processes even more efficient.

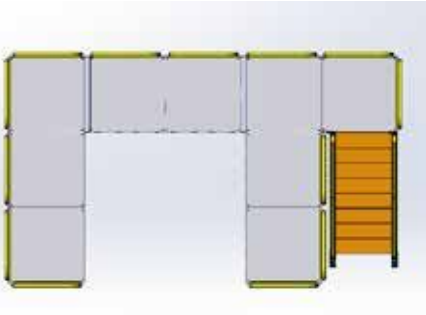
What is the purpose of system technical catalogs?

We can explain the main purpose of the catalog studies briefly as follows: to gain speed in project and production processes and switch to lean and agile production in accordance with our understanding of quality, by reducing the variety of equipments and standardization of the currently used projects and equipments.
As a result of the standardized projects and equipments, the process flow of the purchasing, production and quality departments are much more efficient. Therefore, our modular and lean concept is at the forefront in the new products we develop.

What are the advantages of system technical catalogs?

- Accelerating design processes with standard projects
- Reducing product variety with standard equipment
- Improvement in purchasing with standard equipments
- Transition to agile and lean production with standard production processes
- Improvement in quality control processes
- Optimized production costs





• Fast and agile production
• Maintenance and service convenience

Improvement in production processes

As Sistem Teknik, while the world was under the influence of the pandemic we turned our direction to lean production. With the Kaizen works, our modular platform, insulation materials, line materials and many other product groups started to take their places in ST Library. The modular platform project, one of the products recently added to the ST Library. We have standardized systems such as platforms, balustrades and stairs that require much work force both in terms of projects and manufacturing, and we have added them to our agile design and production understanding.

Faster, more efficient

The modular platform project, which we have transformed into a standard project, accelerates the process by providing great convenience to the designer while in the design phase. As the design is modular, the assembly time of the platform in the production area is also shortened. This system, which can be easily assembled and disassembled, provides many convenience during the packaging and shipment stages due to its modular structure. We continue to work with our strong and experienced staff in order to make all our processes faster and more efficient by adding many of our projects similar to the modular platform project to the ST Library.

> It aims to reduce equipment diversity by ensuring standardization in projects and equipment used in design, purchasing and production processes in catalog studies; In this way, we aim to gain speed in project and production processes and to switch to lean and agile production in accordance with our understanding of quality.

FESTO DIDACTIC TURKEY GIVES THE KEY OF SUCCESS TO INDUSTRIAL COMPANIES

Festo Didactic serves 61 countries as the world's leading supplier of technical teaching solutions. It guides industrial companies in acquiring the necessary equipment. In today's success, as 3E Industrial Eagleye RSD® software assume an important role, Festo Didactic offers a wide range of turnkey training solutions in the field of industrial technology. Festo Didactic Turkey General Manager Alpay Özkan, shared the company's past and how their ways met with 3E Industrial.

Alpay ÖZKAN
Festo Didactic Turkey General Manager

Could you tell us about your company and solutions?

Festo is the world's leading provider of automation technology and, with Festo Didactic, the world's leading supplier of technical teaching solutions. As a globally managed independent family business with headquarters in Esslingen, Germany, Festo has been the performance leader in its industry since 1925. This achievement is the result of specialized and diverse technical education and training programs, as well as

the ability to continuously innovate and solve problems in all aspects of pneumatics.
Today's people need an education system based on problem solving, applying principles, analytical skills and creativity, rather than an education based on rote. In the teaching process, feedback correction approach is more needed to increase high level mental development, in order to increase the ability of advanced thinking, giving hints, providing participation, using practice, greatly improves learning in the full learning method.
Festo Didactic, with its experience since 1965, offers training, skill development, competence and consultancy services in approximately 61 countries around the world. We are the world's leading supplier of technical education and training institutions as well as a provider of consulting and training services for the industry. We have equipped more than 36,000 education and training institutions with our own equipment. Our aim is to maximize learning success in educational institutions and industrial companies around the world.
With the Training Needs Analysis study, which we set out with the understanding that you can manage what you can measure, we measure the competencies of the working personnel with theoretical and practical tests and create training programs based on the competencies that need to be developed with personalized training programs. Festo Didactic, which will respond to the demands of the economy and the labor market, places great emphasis on applied technical training for the industry needs. In line with this importance, we organize trainings for 5,000 people every year in our country. Education and training institutions and industrial organizations around the world rely on Festo Didactic to support their technical education efforts. We offer turnkey training solutions in a wide variety of industrial technology areas.

How did your ways meet with 3E Industrial? What is your reason for choosing Eagleye RSD® software?

We thought that our Industry 4.0 model factory system would work much more functionally with Eagleye RSD® software. During our meetings with 3E Industrial, we got information that the software will work perfectly with the equipment produced for Industry 4.0. Due to the flexibility of the firm's software, we made it possible to control all changes and additions on the system through the software. In short, the reason we chose this software is flexibility, equipment compatibility and real-time operation by visualizing the entire system.

What did you get from this choice?
It made the Industry 4.0 model factory system a more understandable and easier to use system in trainings. In addition, flexible manufacturing systems, which is a very popular topic today, and it allowed it to be used in real time.

What do you think is the most important factor in working with 3E Industrial?

The company works with a customer satisfaction focus and is an institutional R&D company. We have been working for many years due to the technical support, training and after sales support provided by 3E Industrial in the process from the project stage to the commissioning of the system.

We would like to get information about your R&D investments and studies.

Our R&D center is in Germany, and we allocate 8% of our annual turnover to R&D studies. 100 patents are obtained annually. In

> WITH PRACTICAL TRAININGS IN INDUSTRIAL ESTABLISHMENTS, WE WILL CONTINUE TO MINIMIZE LOSSES AND PROVIDE VALUE-ADDED TRAININGS

Festo Turkey, by using our design center we support our clients' R & D activities with tailored products and solutions. We design products with modifications in line with the needs of our customers, our customers obtain patents for the modifications made.

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

As Festo, we fulfilled the requirements of the hygiene, infection prevention and control certification program by the Turkish Standards Institute, and we were entitled to receive the "TSE Covid-19 Safe Production Certificate. Thus, we have secured the health of both our employees and our customers." We continue to protect our employees and customers by increasing our measures every day. Our company has quickly adapted to the COVID-19 process and the new normal due to its strong IT infrastructure. All of our personnel, except the logistics and production departments of our company, have been working as home offices since the first days of the pandemic process. We moved most of the training activities from face-to-face training to online training. We accelerated our establishment goal of the e-learning platform and it will be operational in January 2021. In this sense, Turkey's largest SCORM (interactive training) will be based on technical training platform.

Finally, what are your goals for the future?

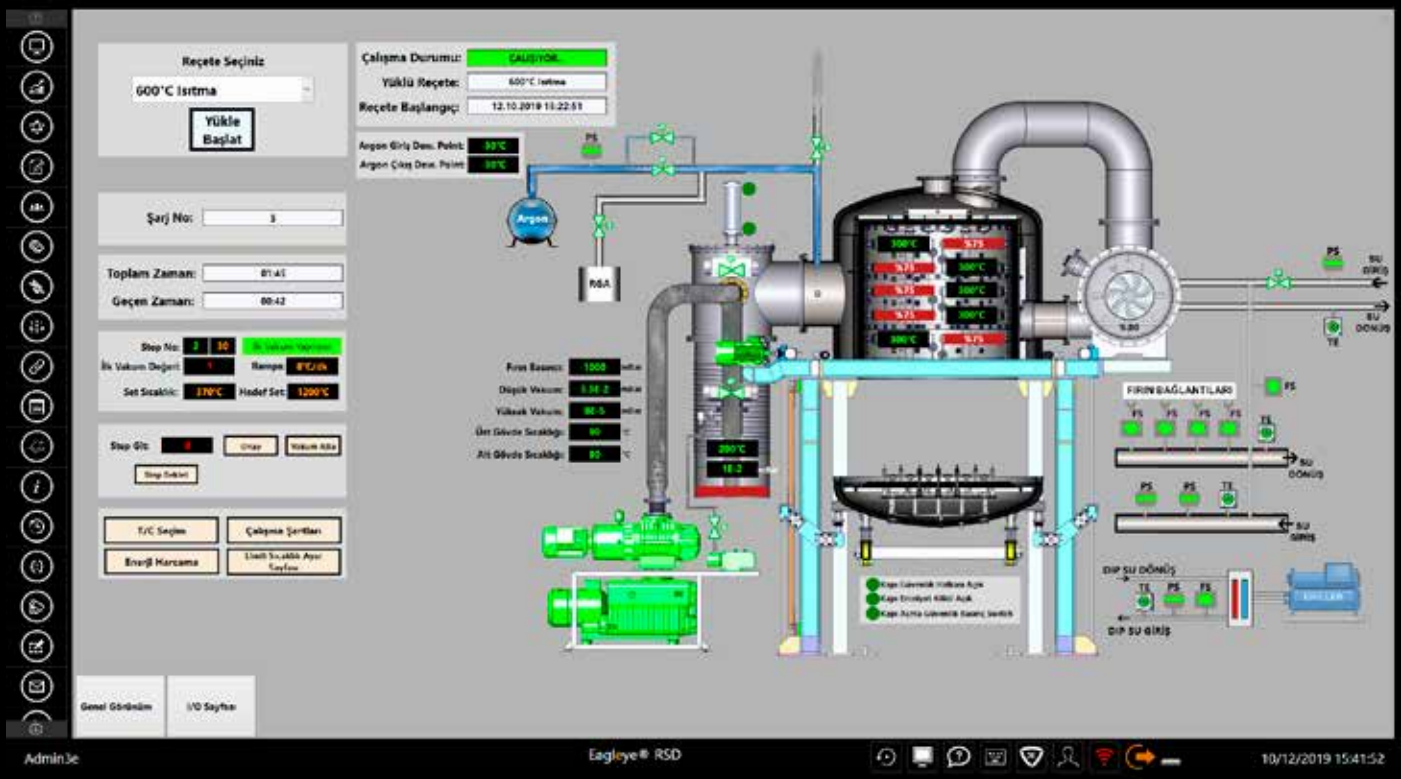
Festo, the world leader in the field of Automation and Technical Education, continues to lead the market with investments and innovation studies. To support their technical education efforts with educational institutions and industrial organizations around the world and to carry out their activities together. Turkey also enables the development of industry and industrial, blue and white collar individuals, to increase their competence in the Industry 4.0 new industrial revolution is one of the our top priority. We have established and will continue to establish new training laboratories on new industrial revolutions, together with many universities, vocational high schools and non-governmental organizations. We take an active role in creating curricula at the 4th and 5th level (Vocational High School and Vocational High School) in the established laboratories, and we will continue to do so. We will continue to provide value-added trainings by minimizing the losses in the industry with practical trainings to be held in industrial establishments.

KEEP UNDER CONTROL

The Visualization and Control of Your Process and System

Eagleye Runtime Scada Designer
makes you Better&Faster

- Vacuum Furnaces
- Nitriding Furnaces (Kn&Kc&Ko)
- Autoclaves
- Atmosphere Controlled Furnaces
- Fire Testing Furnaces
- ... much more



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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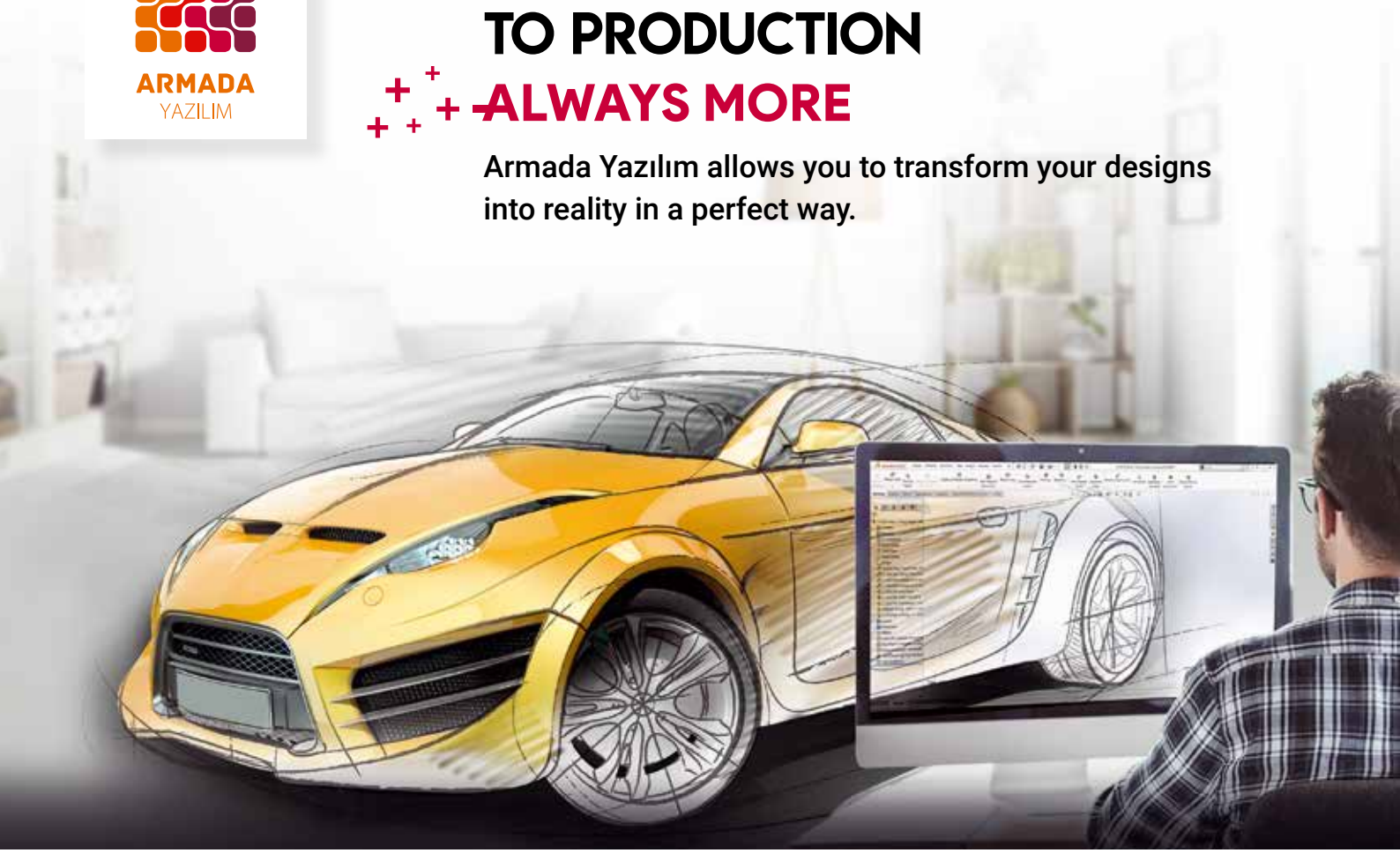


WE ACCELERATE OUR PARTNERS' WORKFLOWS WITH STATE-OF-THE-ART SOFTWARE SOLUTIONS

SOLIDWORKS

Unique user experience in 3D modeling

SOLIDWORKS products give you full control over the entire design process. With its user-friendly interface and intuitive work tools, SOLIDWORKS provides you with the advanced capabilities to design innovative products. SOLIDWORKS allows you to work on both simple assemblies and complex designs. It accommodates many tools that you can use to manage data, share within your team and create professional-looking marketing documents. Besides giving you the necessary tools for rapid and flawless product designs, it can also play key role in enabling cost-efficient and high quality product development.

HYPERMILL

Produce impeccable parts with the world's most powerful CAM solution

hyperMILL is a flexible, modular CAM solution that enables 2.5D, 3D and 5-axis milling as well as high-speed cutting (HSC) and high-performance cutting (HPC) operations. hyperMILL provides highly innovative and flexible CAM technologies to help companies maintain and continuously improve their competitive edge in the field of design. Thanks to the effective use of existing tools and workbenches, it also significantly improves programming and machining times, enables more efficient use of resources and extends their lifecycle. It is compatible with all existing CAD solutions, providing its users with maximum benefit and speed.

MARKFORGED

Create a difference in the world of 3D Printing

MARKFORGED, the world's first and only 3D printing system capable of printing carbon fiber parts, provides printers that can empower engineers and manufacturers to eliminate barriers between the design and production of strong and functional parts. It integrates a significant amount of strength and versatile stability into your parts by using materials such as metal, carbon fiber, kevlar, fiberglass, Onyx and high-strength fiberglass. You can print parts with tough plastic Onyx material or more flexible Nylon material and use these parts as a visual reference or use them in your assemblies by reinforcing them with fiber.

3DEXPERIENCE

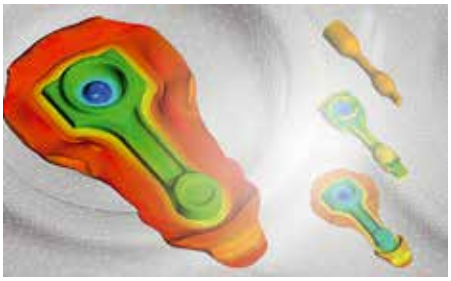
Create designs anywhere, anytime

With its cloud-based structure, 3DEXPERIENCE enables quick, seamless collaboration in all of your operations from design to production. It offers a perfect platform for production process planning, maximum collaboration and continuous management. With 3DEXPERIENCE, you can search everything related to your project through a single platform. Leveranging all the benefits of cloud base designs and access them anywhere, anytime without high performance computer hardware.

GIBBSCAM

Precise toolpaths even for the most challenging operations and complex machine tools

With its advanced tool paths and flawless postprocessor, GibbsCAM is a "CAM" system that offers you all the necessary tools to program parts more quickly and shorten processing times. Today's multi-task machine tools incorporate a wide variety of turret and spindle combinations with endless possibilities. A dual spindle, dual turret configuration is quite prevalent with machines having more than two spindles or turrets which are increasingly common.



QFORM

Thanks to its user-friendly interface and techniques, perform the quickest simulations with QFORM

QFORM is designed to simulate and optimize hot forging, cold forming, open-die forging, ring rolling, extrusion and other metal shaping processes. It also has additional modules such as microstructure calculation and heat treatment simulation. QFORM software is extremely powerful and universal. Therefore, it can be used to simulate any kind of metal shaping process. The software improves your work productivity by allowing you to review each step of simulation from a single window and edit initial data or simulation parameters where necessary.

WITH US, YOU WILL ALWAYS BE A STEP AHEAD!

Armada Yazılım provides engineering services to thousands of users and has more than 10 years of experience. Software solutions developed by our R&D engineers always exceed expectations.

Adopting the principle of seamless services from design to production, we embrace the technologies of tomorrow and make progress together with our business partners by offering solutions for their emerging needs. Based on our experience in various industries, we provide multi-purpose strategic solutions in many areas ranging from design to production, post-sales support services and training.

With our team of experienced engineers, we are committed to increasing our brand value even more and maintaining our leading position in the industry.

5 AWARDS AT THE 3DEXPERIENCE WORLD 2021 EVENT

We recieved 5 awards at 3DEXPERIENCE World 2021, the biggest worldwide design event held by Dassault Systèmes. We ranked first in the EUROMED 3DEXPERIENCE Active Users Category in Turkey and won first place in the 3DEXPERIENCE Overall Active Users Category.

Our sales representatives also awarded with first, second and fourth place among all sales representatives in the Turkey and Greece region. These and other awards reflect our success and increase our commitment to always do more.

ArmadaWorks, developed by the Armada Yazılım as a plugin to SOLIDWORKS, which is a 3D design program with the greatest number of users throughout the world, offers user-oriented software and strategic solutions. It helps you save time and cost by streamlining your business processes.

What Benefits Does ArmadaWorks Offer to Business Partners?

A review of R&D and Innovation processes of companies in Turkey reveals that these processes include far too many repetitive tasks. R&D centers, design centers and project teams spend approximately 40% of their time performing repetitive tasks. With software tailored to your processes, you can allocate more time to your projects and focus on innovation and development processes.

Why was ArmadaWorks Developed?

ArmadaWorks is intended to help companies save time by automating routine tasks. ArmadaWorks software automates routine tasks that take additional time during product and assembly design processes, helping companies to achieve substantial time savings and minimize errors.

Key Benefits of ArmadaWorks

1 It helps you accelerate your production process by generating production images of your assemblies with a single click.

2 With the Flatten command, you can export flat patterns of all of your sheet metal products and automatically save them as dxf or dwg files.

3 With the Convert command, you can convert your files to dxf, dwg and pdf formats with a single click.

For more information about ArmadaWorks, contact us.

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PRIDE OF TURKEY: YÜCEL BORU

Yücel Group is a great company which produces pipe and profile for more than half a century. We are proud of Yücel Boru success with its supply and service among the world. Yücel Group preffered a cooperation with Sarvion for their new Pipe Annealing furnace mounting and commissioning.

Yücel Boru is one of the leading companies operating in the iron, steel and pipe industry. Could you briefly tell us about the company's history of foundation and its place in the industry?

As Yücel Boru ve Profil Endüstrisi A.Ş., we continue the production activities that we started in Kocaeli Çayırova region in 1969, in our facilities in Gebze / Kocaeli, Osmaniye / Adana and Yeşilköy / Hatay. While continuing our investments uninterruptedly with the awareness and responsibility of being a pioneer company in the sector, we have included cold drawn pipes in our product range as well as the existing industrial pipes with the Precision Pipe facilities that we commissioned in Kocaeli Gebze Organized Industrial Zone in May 2020.

Could you provide brief information about the new Precision Pipe Production Plant you have established in the Gebze Organize Industrial Zone, which is a new investment for Yücel Group?

Yücel Precision Pipe facility is a factory that started to serve the automotive and sub-industry, household appliances, furniture, electrical household appliances, construction, machinery and energy sectors in the second half of 2020 with the use of cold, acidic, galvanized and aluminum coated sheet metals as raw materials. As Yücel Pipe ve Profile, we started to produce cold drawn pipes, which are not among our product range, and offer them to our customers for the first time in this factory. Although these pipes are mostly used in the automotive suppliers industry, they are evaluated in a wide range that requires precise tolerances and different mechanical properties. In this direction, in addition to slitting and pipe-profile welding lines used for welded pipe production, annealing furnace, cold drawing line and advanced processing equipment investments were also commissioned. Our facility, which is established as a closed area of 47,000 square meters on an open area of 100,000 square meters at the first stage, and used current technologies in its field with a simple understanding, continues its journey to create a sustainable ecosystem with the awareness of the responsibility of protecting the environment and contributing to the green.

Could you please make an evaluation about the general progress and processes of the commissioning project regarding Annealing Furnace you have conducted with Sarvion?

Annealing furnaces are extremely critical lines for our GOSB facility and similar facilities. The commissioning processes of such lines can be quite challenging. We carried out processes such as the installation and commissioning of Annealing Furnce line in our GOSB factory with Sarvion. Yücel Boru and Sarvion companies performed a successfull cooperation in a coordinated and devoted way, the determination and focus has been the main factor in overcoming many problems that make things difficult, especially during the pandemic period. We consider that it is an important achievement that the commissioning processes, which are frequently encountered with situations requiring flexibility and where compliance with project plans are difficult. We evaluate our cooperation with Sarvion, that we reached a result that our quality and efficiency expectations were met.

What are the gains in terms of the business as a result of the cooperation? As a solution partner, have Sarvion met your expectations regarding this project?

Cooperating with Sarvion for our annealing furnace provided advantage to our company in many aspects and saved time. Professional Project management of the process in the field, flowing of simultaneous information about the ongoing works to the management mechanisms and making the necessary interventions quickly were important contributions. In this context, Sarvion company has demonstrated a performance that meets expectations with its constructive approach, compliance with teamwork and determination to reach results. We would like to thank all participants who contributed to the process.

What are the gains of choosing the local service network for the installation and commissioning of the Furnace?

Yücel Boru is a company that prioritizes the development of the local suppliers and starts from the narrowest circle around its businesses to create a supply network and to meet its needs. In this direction, it prefers to work with local companies within the bounds of possibility. Being aware of the value and contribution of this approach, Yücel Boru collaborated with Sarvion, the leading company of the sector, in the project mentioned above. This cooperation has been beneficial in reaching results with gains such as effective communication, taking quick action, and ensuring the harmony of teams with each other in a short time.

Yücel Boru is the one among the companies that invest the most in R&D. Could you tell us about your R&D activities and the budget you have allocated for this issue?

Yücel Boru devotes significant resource to progress in its industry and has established its development activities and R&D to create value for its customers. It is a modest institution that receives praise from all parties. In this direction, it has allocated more than 60 percent of its investments to new products and new technologies for many years, while contributing to both the country and its customers, it continues to strengthen its leading position in the sector. As a result, focusing on new products and improving our quality level and costs with new technologies contributes to our domestic and foreign customers in their own processes and competitiveness, and increases the recognition of the Yücel Gorup as a brand day by day.

Could you tell us about your company's future goals and expectations?

Yücel Boru ve Profil, a part of Turkey's leading steel group and the leading company of the pipe-profile industry, continues its investments with ambitious targets in order to increase the added value it produces. While adding value-added products to its structure with new product studies, it continuously increases its technology in its current processes and carries out a multi-dimensional growth strategy with firm steps. Believing that its most important source in this journey is its corporate culture focusing on continuous improvement, intense communication with its customers and its employees who believe in development Yücel Group, growing exponentially is the aim in its short and medium term plans.

> "As Yücel Pipe ve Profile, we started to produce cold drawn pipes for the first time and offer them to our customers."

SARVION

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for all your industrial furnaces

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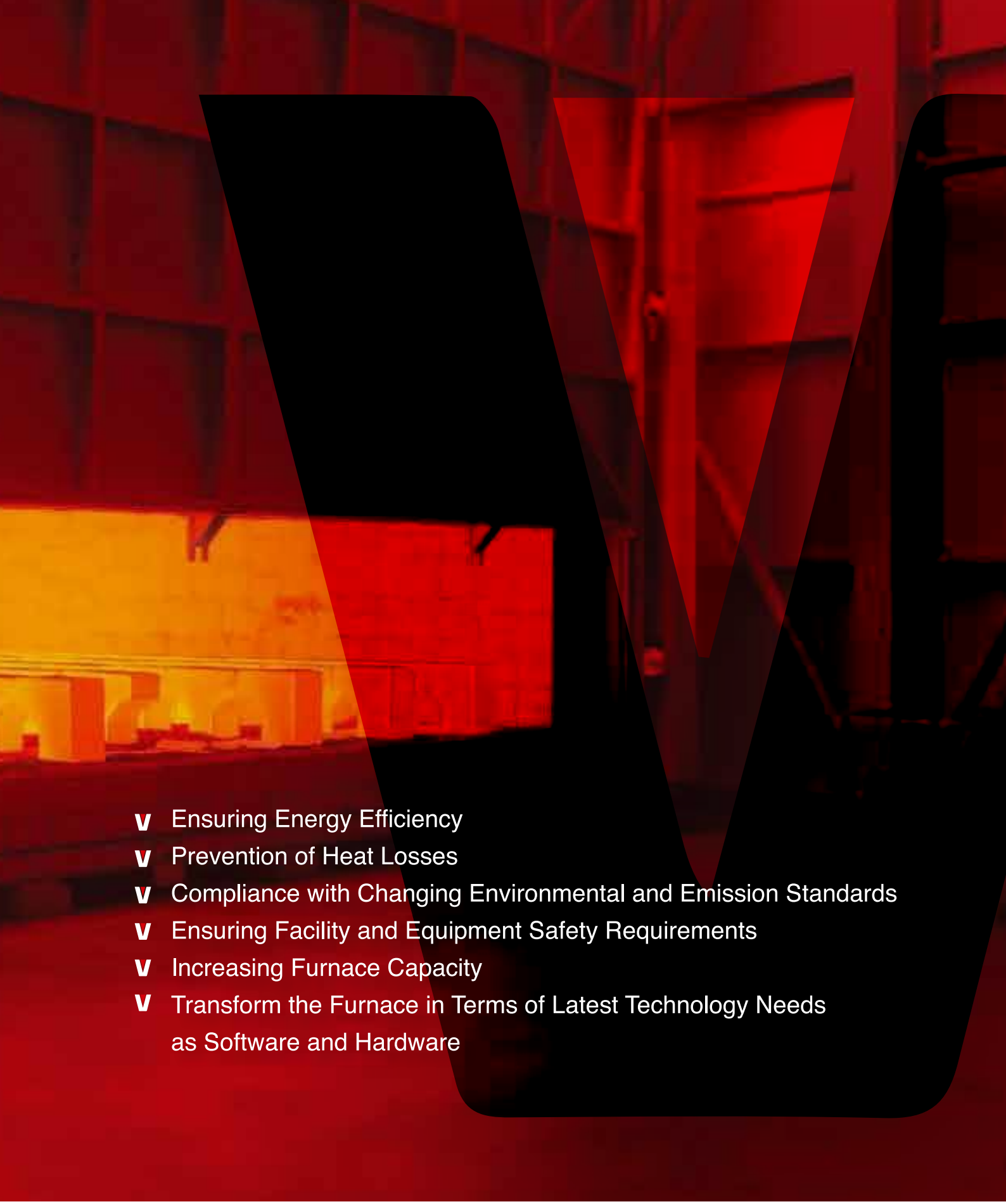

- Ensuring Energy Efficiency
- Prevention of Heat Losses
- Compliance with Changing Environmental and Emission Standards
- Ensuring Facility and Equipment Safety Requirements
- Increasing Furnace Capacity
- Transform the Furnace in Terms of Latest Technology Needs as Software and Hardware

As Sarvion, we support you in maintenance, service, revision and modernization for your furnaces of all brands and models.

ÇİNKOSAN ALWAYS A STEP AHEAD

Being a pioneer in its sector with its experienced staff, long-lasting success and rapid adaptation to the latest technology, Çinkosan continues to raise the bar all the time.

Çinkosan operates as a group company of Yanmaz Investment Holding A.Ş. With its 30 years of knowledge, production technology and dynamic team, it has a facility with a total pool capacity of 1500 tons for the surface coating sector. In this facility, Çinkosan produces Alkaline Zn Hanger, Alkaline Zn-Ni Hanger, Alkaline Zn Cabinet, Alkaline Zn-Ni Alloy Cabinet, Acid Zn-Ni Cabinet, Alkaline Zn-Ni Cabinet, Zinc Flake Coating (Solvent and Water Based), Zinc Phosphate and it produces Manganese Phosphate, Alkaline Zn-Fe and performs coating services with thermal diffusion. All these processes can be monitored under the supervision of plants and machines by working with Data Based Control and Surveillance Systems (SCADA). Thus, labor productivity and service quality are increased in a shorter time. Çinkosan also designed the robot technology to be used in its facility together with its sister company, Ceylan Makine. It accelerates the sector with its position as the supplier of all machinery equipment, especially robot and treatment plant, of the surface coating sector. Standing out with its sensitivity to the environment, Çinkosan has a daily treatment capacity of 300 tons of the treatment plant it has established, and in this way it manages to keep the final waste amount at minimum levels.

CİNKOSAN

Surface Coating Technologies

WITH 40 YEARS OF EXPERIENCE

TO THE DEVELOPMENT OF THE FASTENERS INDUSTRYWE CONTINUE TO GROW BY CONTRIBUTING AND INVESTING.

45 tons of production per year

135 TL turnover per year

12,000 m^2 plant completed in Istanbul in 2020, 16,000 m^2 plant continuing in Istanbul and 18,000 m^2 plant have already started in Izmir.

investments in a total plant area of 46,000 m^2

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Industry 4.0 Solutions

For The Heat Treatment Industry

Designed & Manufactured to meet

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AIAG CQI-9

CCPI Europe

Excellence in Temperature Measurement

Temperature Sensors | Thermocouple Wire & Cable | Calibration | Servicing

Industry 4.0 Advancements
for
Pyrometry Manufacturing

Technology is designed specifically to make life easier, simpler and more enjoyable. We've brought smart technology into our homes, our cars and our pockets, but for some unknown reason, not our workplaces. Manufacturing is notorious for being well behind the technological curve and especially when it comes to smart tech and the IOT.

The introduction of the Industry 4.0 concept is bringing the industry up to speed but Covid has accelerated that quicker than anyone could imagine.

Scanning bar codes or QR codes has become more common within everyday life. Thanks to the Covid-19 global pandemic, the world is being forced to modernise and incorporate these simple processes into the working day.

In 2017, CCPI Europe began its industry 4.0 advancements by launching Pyro Tag, the FREE thermocouple data analysis smart phone app, paired with the scannable smart tags attached to every thermocouple that leaves the production line.

"80% reduction in time preparing paperwork for, and during audits"

The app and tags were specifically designed to save the customer precious time and reduce the costly human errors in the data entry process. The additional benefit is the removal of the mountains of paperwork that come with the necessity of traceability. Scanning the smart tag brings up all the information needed such as serial numbers, calibration data and certificates, which can be emailed in various formats for importing into furnace compliance software.

From the automatic generation of calibration data in the CCPI Europe Laboratory to the customer importing that data into the furnace software, human interaction is eliminated. This creates a secure and automated process with dramatically reduced opportunity for error. Since using Pyro Tag, customers have reported experiencing up to an 80% reduction in time preparing paperwork for, and during audits, not to mention 100% reduction in headaches!

Lately going digital has been more important than ever. Remote working is becoming the new normal with people having to wear multiple hats across multiple departments. The need to minimise long and tedious tasks, with the added bonus of the ability to work from anywhere in the world makes Pyro Tag the solution going forward.

Request a virtual demo from your local area rep now and find out how much time you can save!

To find out more about industry 4.0 advancements within the heat treatment industry or more about CCPI Europe's thermocouple & calibration solutions visit www.ccpi-europe.com

Did you know?

The average office will use 10,000 sheets of paper per year, and it takes roughly 5 litres of water to produce a single sheet of paper. Upgrading to Pyro Tag will not only save you time and money, but reduce your carbon footprint!

GET IT ON Google Play

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LEVENT GANIYUSUFOĞLU TELLS;

"SYSTEM TEKNIK IS A VALUE OF TURKEY"

The best proof of success is that there are people who praise you. We are happy to receive the appreciation and thanks of Korkmaz Çelik Chairman of the Board, Levent Ganiyusufoğlu, as the entire Sistem Teknik team, renewing our motivation and strengthening our work.

Levent GANİYUSUFOĞLU
Korkmaz Çelik Yönetim Kurulu Başkanı

Our company started its activities in 1953 as Marathon Steel. At that time, we had partners who were farmers from Maraş. In those years, there were two steel companies in Turkey. In 1973, Korkmaz Çelik LTD ŞTİ was established in Tophane by leaving the partners. In those years, when I left school, I always went to the company. I was studying at Maçka Art Lathe Leveling department. School would end at 13.30; I used to go to Tophane to the company. When I finished school, I first went to the military. In 1977, after military service, I went to a language school in London. Then I studied Marketing Management there. At the end of 1982, I returned to Turkey and started to work in the company. When I started working, there was no company that made customer visits. The customer would come with his pickup truck and pick up his steel. I started the first customer visits. I bought a truck for the company and started shipping to the customer. In an instant, things had grown.

The beginning of a new era with Heat Treatment Furnaces

The industry was small in those years. My father used to sell 200 tons of steel annually. We started to work with the Swedish ASSAB company. I attended many seminars in various parts of the world with ASSAB. I visited all their investments in the Far East. Heat treatment plants were my area of interest. When they bought 500 tons of steel annually from ASSAB for one year, they said, "We will be your partner, too." In 1996, ASSAB KORKMAZ A.Ş. was established. We had a salt bath heat treatment plant before. In 1995, I bought two vacuum furnaces from Ipsen Company from Germany. Only rivals at that time, a company had brought a second hand oven from Italy. Heat treatment furnaces contributed to the growth of our company.

Growing up or getting fat?

In the following years, the Austrian company Böhler bought the company ASSAB UDDEHOLM. Böhler joined our board of directors. The company grew a lot in 2003. As it grew, so did the number of employees. The General Manager at that time loved to recruit staff. He used to say to me, "We're getting big." I would say to him, "We are getting fat, we are not growing anymore". As the company grew, some of my executive friends got spoiled. No more respect. I told the partners that I wanted to change the General Manager. They replied that if we take it out, it will go to the opponent. At that time, I said I would leave, I

left the company by selling my shares at the end of 2007. When I was leaving, I named some people and said, "If they don't leave, the company won't move forward." It took them 10 years and they finally got the people I told them out.

"Wherever there is manufacturing, we are there"

Today, we cover all industrial zones of Turkey with our dealership network. Wherever there is manufacturing, we are there. Automotive is the main industry we are supplier to. We serve the Iron and Steel industry, the packaging industry, the plastic and glass industry and the aluminum industry. We have a branch in Russia. We employ a Russian Engineer there.

How I met Mehmet Özdeşlik

I knew Sistem Teknik for years, but I had never met him. In the early 2000s, they came to us and said that they would build a Vacuum Oven. It was at that moment that I met Mehmet Özdeşlik, my dear friend today. We bought the first oven they made. Since then, we have bought many ovens from Sistem Teknik. We have not even received an offer from a competitor company in any of our furnace purchases. When there was a malfunction in the furnaces I bought from Germany, they would say, "First send us 10,000 euros, then we will send you workers". When there is a problem in Sistem Teknik ovens, it is at our service door within 3-4 hours. At the same time, we protect the country's currency.

"We are a company that respects nature"

When heat treatment was done with vacuum furnaces, it became a cleaner application that did not allow human error. While 15 people work in a salt bath, you can manage 6-7 vacuum furnaces with 2 people. No harm to nature. Last year, we also made a solar energy investment in our Manisa facility. Now we have become a company that respects the nature completely.

12 years of success

We have been the Turkish distributor of Japanese Hitachi for 12 years. We also send steel to Germany, Italy, England and Russia. We also represent SSAB Company from Sweden to TOOLOX steels. We are the top steel selling customer in Europe. Powder metal steels are also represented by us in the company RASTEEL from France.

"We are developing our product range"

Our heat treatment facilities are in Manisa and Bursa. In our Manisa facility, we have a 16 bar hardening furnace with a size of 1000 x 1000 x 1500. We have two Vacuum Temper and Nitriding furnaces and 3 dry Temper furnaces. We have a Vacuum hardening, a Vacum Temper, nitrilation and a dry Temper furnace in Bursa. We are adding a new Vacuum tempering furnace this year.

Words of praise for Sistem Teknik

Sistem Teknik is an asset of Turkey. It has saved Turkey from foreign dependency in many fields from the defense industry to the aviation industry. It has a wealth of knowledge and trained staff. Companies such as Sistem Teknik should be supported by the state and by the industrialists.

> Ganiyusufoğlu: "Today, we cover all industrial zones of Turkey with our dealership network. Wherever there is manufacturing, we are there."

EVAS HOME APPLIANCES SUCCESSFULLY

EXCEEDING BOUNDARIES SERVING 78 COUNTRIES

When two successful companies such as Evas Home Appliances and Sistem Teknik come together, the value of production and quality becomes even more evident. Evas Home Appliances, together with Sistem Teknik, which serves as a good solution partner, is proud of achieving successes that go beyond the borders.

A company that crosses borders in the tube production sector, Evas Home Appliances exports to 78 countries with an annual production capacity of 2.5 million. Evas Home Appliances, which has made its name known abroad with its success as one of the leading companies in its sector, continues its efforts towards world leadership without slowing down. In our pleasant conversation with Evas Home Appliances General Manager Emrah Sak, we talked about the past and present of the successful company. We listened to how their paths crossed with Sistem Teknik.

First of all, we would like to introduce you briefly to our readers. Can we get some brief information about your company?

Evas Home Appliances Inc. as a SHV Energy company, we produce tubes by operating under SHV Energy. We are one of the important tube production companies in the market with our annual production capacity of 2.5 million. By exporting 92 percent of our products abroad, we make significant contributions to the country's exports. We export to 78 countries in the world.

How did your paths cross with Sistem Teknik? How did the idea of choosing a Natural Gas Heated Tube Annealing Furnace come about?

The crossing of our paths with Sistem Teknik dates back to 1994 and we still continue to work together and support each other today. The idea of choosing a Natural Gas Heated Tube Annealing Furnace was born when we focused on exports and intensified our work in this field. In the current situation, the important process of tube production, normalization annealing, had gained importance. Our current annealing furnace was

> "Stating that they have been collaborating with Sistem Teknik for 30 years, Sak stated that as Evas Home Appliances, they have purchased 5 annealing furnaces so far and they are currently working on furnace maintenance."

falling behind in responding to our requests with capacity, calorific value and loading status. For this reason, Liotard, our group company in France, was contacted. The same furnace they used would be manufactured for us in Turkey, the owner of the project would be Liotard. As a result of these contacts, another company in France offered us the roller system. Thus, some parts to be sent as semi-finished products would be made and assembled in Turkey. This project was a very costly and laborious project. When this is the case, together with our team, "Well, can this entire system with rollers be made in our own country?" We sought an answer. Meanwhile, we learned that Sistem Teknik has built a 400 degree centigrade roller rice annealing furnace. As a result of the contacts, rolls resistant to temperatures over 1000 degrees Celsius were procured from America. The project work took a full year. The furnace was manufactured in the production area at DES Industrial site and on October 9, 1995, the furnace became operational. This first furnace working with LPG gas was later converted to facilitate the use of natural gas. We believed in this project and we succeeded. The most important detail is that, after this successful work, Sistem Teknik produced this roller oven in Liotard, and made production for companies from our company group located in Brazil, and made us feel this pride.

Tube annealing furnace is widely used in facilities producing in LPG sector. What has changed with the tube annealing furnaces you use in your production?

With the commissioning of the roller furnace; the heating values of all tubes, subject to the pan, were at the same temperature. We have reached normalization values of 900-950 degrees Celsius. There was an increase in capacity and the loading was changed from manual to automatic feeding and removed from the initiative of the worker. The thermal values were recorded. At the same time, the annealing cost of the unit tube and the flue gas waste values in accordance with environmental standards were controlled.

How many years have you been receiving service from Sistem Teknik? Which products and services do you use?

We have been working for 30 years. We have purchased 5 annealing furnaces so far. We are also currently working on furnace maintenance.

Can we get information about your R&D studies?

We continue our investments in R&D regularly every year. With the budget we allocate in this context, we aim to increase the level of automation and increase capacity by increasing our work efficiency, especially occupational safety.

Can you tell us about your goals for the next year, hoping to leave behind the effects of this difficult process we went through due to Covid-19?

Continuing our growth in the next year, we will continue to work towards the world leadership we aim for with our motto of "zero customer complaints and zero work accident".

Finally, what are your thoughts on Sistem Teknik?

Sistem Teknik is a good supplier and solution partner of Home Appliances Inc We believe that we will achieve new successes with our belief that this cooperation will last for many years.

NAME OF SUCCESS WITH CUSTOMER SATISFACTION FOR MORE THAN 50 YEARS: ALVA

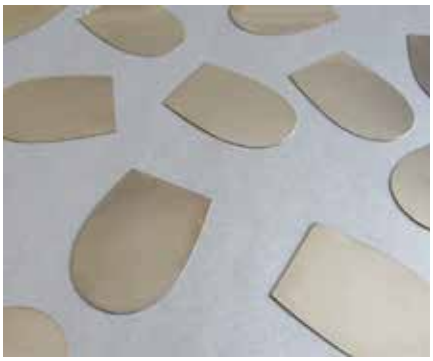
Stepping into the sector in 1961, ALVA has been serving in the shoe industry for more than half a century with all kinds of shoe steel and plastic accessories. The company is always develops itself and reach the successful results with ,ensures the quality controls of its products regularly by using the latest technology in production in order to keep the product quality at the highest level.

With the belief in development and the continuity of quality production, ALVA analyses customer requirements correctly and offers them the most accurate and suitable solutions. The successful company, which collects the fruits of embracing a versatile development without compromising its principles, makes a name for itself as one of the leading companies in the shoe industry. Alva General Manager Ozan Limoncular, who stated that they have carried all this success to higher levels with Sistem Teknik, shared with the readers of Furnace News the reasons for choosing Bainitic Heat Treatment Annealing Furnace in all details.

Can we get information about your company?

Our company was founded in 1961 by Vartan Alatçiyan; It was established as a small workshop by starting to produce toe and heel irons used in shoes and used to prevent the abrasion of shoe soles, especially leather. These products have begun to leave their place to more durable and more functional parts with the developing sector components. Today, we are a company that produces steel and plastic nose cambers and

Ozan LİMONCULAR
Alva Genel Müdürü



steel soles used in work safety shoes during the historical development of shoe cabin steels and all parts that we produce by applying heat treatment, and is a leader in its sector.

How did your paths cross with Sistem Teknik? How did the idea of preferring a heat treatment line come about?

During the development process of our company, firstly the furnaces called oil quench and tempered furnaces were introduced and during this period, the processes of these furnaces were worked on for many years. However, as a result of these processes, it was not possible to achieve the perfect result in the quality of the products we produced or to achieve the sustainable quality standard on a yearly basis. In this context, the idea that bainitic heat treatment can be more effective in our products has emerged, along with the search.

What kinds of changes have occurred in your production environment with the Bainitic heat treatment annealing furnace?

One of the most important features is that we have a much cleaner production area. We think that it is a suitable process for the elimination of chronic heat treatment failures.

How many years have you been receiving service from Sistem Teknik? What products and services do you use?

Starting from the construction phase of the furnace, we have been working on installation, technical services, spare parts supply and information sharing for about 5 years.

> Alva continues its services with sustainable profitability and efficiency at world standards by understanding customer requirements and expectations in the best way, offering them the most accurate and most appropriate solution suggestions, being aware of its ethical values and social responsibility.

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

We have studies on the production of metal and plastic components in various sectors, especially in the defence industry. We aim to add a few of these to our product range in a short time.

Could you tell us about your goals for the next year, hoping to leave behind the effects of this difficult process due to Covid-19?

I think that health is priority and that we are entering a new process that tells us that the whole world has to live with this new perspective. In this process, I hope we will feel the positive effects of the geopolitical structure of our country in the coming years. In this context, our biggest goals in our own product group are to take our exports much further than the current situation, to add the products that are imported and suitable for our production line to our portfolio and to provide the maximum benefit to the country's economy by preventing imports.

Finally, can we learn your thoughts about Sistem Teknik?

We care that every company we work with has real knowledge. Another issue we care about is sharing this knowledge. Sistem Teknik has a good command of these two issues that we care about. Another figure is Sistem Teknik employees who are always smiling, disciplined and motivated.

KARTAL BOMBE INDUSTRY IS AT THE TOP IN 2021 WITH ITS NEW INVESTMENTS AND R&D WORKS

Kartal Bombe Sanayi (KBS) is a company that makes its production strong with its belief in the continuity of development and the determination to work. The successful company continues its R&D investments without sacrificing its goals, with the rapid adaptation provided within the company, even in the difficult conditions we face in the country; increases its export share every year.

In our pleasant interview with Harun Kartal, Vice Chairman of the Board of Directors of Kartal Bombe Sanayi (KBS), we once again understand how important R&D studies are for the development and growth of a company. Stating that they continue their R&D studies without slowing down, Harun, Vice Chairman of the Board of Directors of Kartal Bombe Sanayi (KBS), underlines that they will focus on digitalization studies in the field of Industry 4.0 among their 2021 targets. By conveying our thanks and congratulations to the successful company for their contribution to the Turkish industry, we leave you, our valuable readers, alone with this pleasant conversation.

First of all, we would like to briefly introduce you to our readers. Can we get brief information about your company?

Kartal Bombe Sanayi (KBS) is a global organization that dates back to 1945 and specializes in the manufacture of cambered and curved products. Like many businesses in Turkey, we are a family business, too. As a 3rd generation family member, I have been serving my company and Turkish industry for about 40 years. While I was in high school and university, I was completing my education on the one hand, and contributing to the studies by going to the workplace on the other hand. At that time, one of our biggest needs was undoubtedly the machines used in

our industry. In those days, I started this journey with a machine revision. I am currently continuing with my R&D team of 20 people.

Can we get information about the products and services you offer to your customers?

Kartal Bombe Sanayi (KBS) provides products and services to its customers in 4 different business lines. These are dome manufacturing, pressure tank & spherical tank manufacturing, and bending and heat treatment services of products such as profiles, pipes, cylinders. We have a new investment right now. We have prepared our infrastructure for the manufacture of equipment known as expansion or balance tanks. We will revive our manufacturing and sales activities in a very short time.

Which sectors do you mainly address?

We have been providing products and services as a reliable supplier to many sectors, especially iron and steel, energy, petrochemical, construction, food, for years.

Harun KARTAL
Kartal Bombe Sanayi (KBS)
Vice Chairman of the Board

> Kartal: "Kartal Bombe Sanayi (KBS) never slows down. We are starting to build a gene tank and we are planning to build a 30 thousand square meter indoor facility in our Dilovası OSB factory."

Are you planning new investments as a company? Can you tell us about your investment plans?

I can confidently say that investments in Kartal Bombe Sanayi (KBS) do not slow down at all. We are starting the production of expansion tank, which is a new line of business I mentioned above, and we are planning to build a brand new facility with 30 thousand square meters of closed area in our Dilovası OIS factory.

Apart from these, we are working to implement our state-sponsored projects that we carry out to improve our machine infrastructure and to digitalize our factory. We have already completed our 600 ton press with Tübitak support with NC Playback, we are planning to close the project in 1-2 months and commission our machine.

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

All the machines you see in our factory with the brand "Eagle" are manufactured by Kartal Bombe Industry (KBS). Our Kartal Bombe Industry (KBS) R&D team carries out all the processes including design,

analysis, material selection / supply, installation and commissioning of these machines. Our colleagues in our R & D office, which we call the "Invention Office", successfully carry out the work of machine manufacturing, machine revisions, the design of the molds and auxiliary equipment needed, and the manufacturing of the products.

During the Covid-19 outbreak, radical changes were seen in the production strategies of many companies. What strategy did you adopt in this process?

We never stopped in this process. We continued to work and produce. In order to prevent the spread of the epidemic, we have implemented the mask, distance and cleaning rules recommended by our state at the line stage. We have taken many measures from the 50 percent rule in service vehicles to the use of disposable products.
In addition, we had regular PCR tests. With the Covid-19 outbreak, of course, we had to make changes in our company policies. For example, we did not carry out our marketing activities that we targeted with fair participation due to the cancellation of the fairs. Similarly, we had to postpone our international visits.
Since the epidemic is global, we, like everyone else, have either delayed or carried out all our activities that had to be done face to face or online. With the onset of the pandemic, although there was a significant decrease in the first period, this deficit came back to us exponentially. During this time, we researched ways to reduce waste in production, especially lean production.

> Kartal Bombe Industry (KBS) Vice Chairman of the Board, Harun Kartal, states that they aim to increase their export share to 40 percent in 2021 and to complete 30 percent of the new factory construction.

Finally, can you tell us about your 2021 targets, hoping to leave behind the effects of this difficult process due to Covid-19?

First of all, I wish God's mercy on all our people who lost their lives in this process. With the last quarter of 2021, we hope that the epidemic will alleviate and its effects will disappear. Among our goals for 2021 are to increase our exports to 40 percent, to complete 30 percent of our new factory construction and to accelerate digitalization efforts in the field of Industry 4.0. Apart from these, the investments we will make in our machine park will be as usual.

- Dished Head
- Profile,Pipe,Cylinder Bending
- Heat treatment
- Tank accessories
- Pressure vessel Equipments

KBS
Kartal Bombe Sanayi




ASME U • AME U • ASME S • GOST R • ISO 3834 - 2 • AD-2000 W0 • AD-2000 HPO • PED 2014/68EU • ISO 9001 • ISO 14001 • ISO 45001

VACUUM TANK

Founded in 1945, Kartal Bombe Sanayi (KBS) is a heavy industry establishment that grows with the fourth generation of the Kartal Family today. KBS, which is a global organization, is one of the leading companies in its sector that has grown with its own developed capital. As a reliable and known metal forming supplier for the world's most respected industrial organizations, it is Turkey's first and the world's leading specialty brand with an annual metal processing capacity of 60 thousand tons.

from formins expert to all over World...

Kartal Bombe Sanayi (KBS), founded in 1945, The heavy industry that grows today with the fourth generation of the Kartal Family's establishment. KBS, a global organization, is one of the leading companies in its sector that has grown with its own developed capital.

For most respected and reliable industrial companies in the world known as a metal forming supplier with annual processing capacity of 60 thousand tons of metal Turkey's first, it is the world's leading brand of expertise.

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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 presents high level engineering services to approximately ten thousand customers all around the world, with boutique and customer based exclusive service philosopy. On the other hand; the company Baykal is also offical distributor, agency and representative of many European companies in his field. As a stock holder of raw materials which is for electrical heating element producers, he keeps his strong position not only in domestic market, also in Middle East, Central Asia and Eastern European Countries. Finally, the company Baykal Rezistans, with his excellent customer service understanding, will continue to serve his good quality products in next years, to his customers from all over the World. Baykal Rezistans, which offers all of its high-quality products that it is a manufacturer and an importer to its customers with customer satisfaction-oriented studies and on-time delivery principles, and has been constantly renewing itself since its establishment in 1970, will continue to provide excellent and high quality service to its customers around the world. Deputy General Manager **Oğuz BAYKAL** "For 50 years, we have been producing various heating elements required by the industry. We serve all branches of the industry. Our primary goal is to produce qualified and value-added products. 90% of our customers in Turkey are the leading taxpayers of the country's industry. In the last 10 years, we have been producing electrical heating elements that can be used in heavy industry and we have been serving the members of EFSİAD, which produces electrical industrial furnaces for both large industrial organizations and large industrial enterprises. Our most important investment in the recent period is the production of atex certified explosion proof heating elements used in dangerous, explosive and flammable environments. We are proud of being the first and only company that can produce in this field in Turkey. We export to more than 40 countries of the world by improving our quality standards with the superior experience we have gained in Turkey. Among the countries we export to, there are extraordinary examples such as Siri Lanka, Singapore and the People's Republic of China. Our goal is to create a good market by continuously exhibiting our products at international specialized fairs in Europe and to have a permanent place in the industrial heaters sector. " he states the activities of the sector.

Baykal Rezistans San. ve Tic. Ltd. Şti.
Deputy General Manager
Oğuz BAYKAL

INDUSTRIAL TUBULAR HEATERS

Tubular Heating Elements can be used for various purposes. Tubular Heating Elements have been safely used for a long time in heating of Water, Oil, Chemical and Corrosive liquids, heating of Molds and Various Metals in Industrial Ovens. Such heating elements can be manufactured with varying diameters. Standard Diameters are 6.5 mm -8.5 mm-11.5 mm-14.5 mm-16.00 mm. Moreover, we can also manufacture custom-made diameters from 5 mm to 20 mm.The Tubular Heating Elements that we manufacture can perform up to 650°C operating temperature, meeting the needs of recent technological developments. We use stainless steel materials of varying grades in manufacturing of this type of heating elements. Main steel grades used in tubular heating elements include; SS 304-321-316 – 310 S

We also manufacture heating elements by using special alloys. These special materials are Alloy800 - Alloy825 and Alloy600. This type of heating elements can be manufactured with screw and flange connection, thus allow achieving high powers in short areas by collecting many heating elements in one confined area. Tubular Heating Elements can be manufactured with various shapes upon request. The most common shapes straight, U-type and M-type. Our company manufacture flat-shape heating elements with varying sizes in addition to the round Tubular Heating Elements. The primary use of these heating elements include as railway switch heaters, as oil heaters in Industrial Deep Fryers, and as dry air heater in several specific ovens.

Explosion-Proof Tubular Heaters

Baykal Rezistans explosion-proof ex-atex junction boxed tube heaters can be used to heat areas where all possible gases or vapors may be present; for example: in oil / gas platforms, chemical and petrochemical industries and areas where flammable and / or flammable products are stored. Explosion-proof atex boxed tubular heaters can be manufactured with an explosion-proof thermostat. Baykal Rezistans explosion-proof atex boxed tubular heaters are ISSeP approved and comply with the norms specified in European Norms (European Standards) EN-IEC-60079-0 and EN-IEC-60079-31. The pressure resistant construction is approved for gas groups I, IIA and IIB. Safety against explosion is ensured by a directly connected flameproof structure (structure d), a maximum surface temperature of 200 ° C at an ambient temperature of 40 ° C, and a screw cap; In this way, the leak path complies with the specified conditions. For this reason, Baykal Rezistans tubular heaters with explosion proof atex box are in compliance with temperature class T3 and are provided with the reference mark Ex db IIC T3 Gb and Ex tb IIIC T200 ° C Db in accordance with the norms.

THE SECOND INSTALLATION STAGE HAS STARTED AT DUBAI SITE

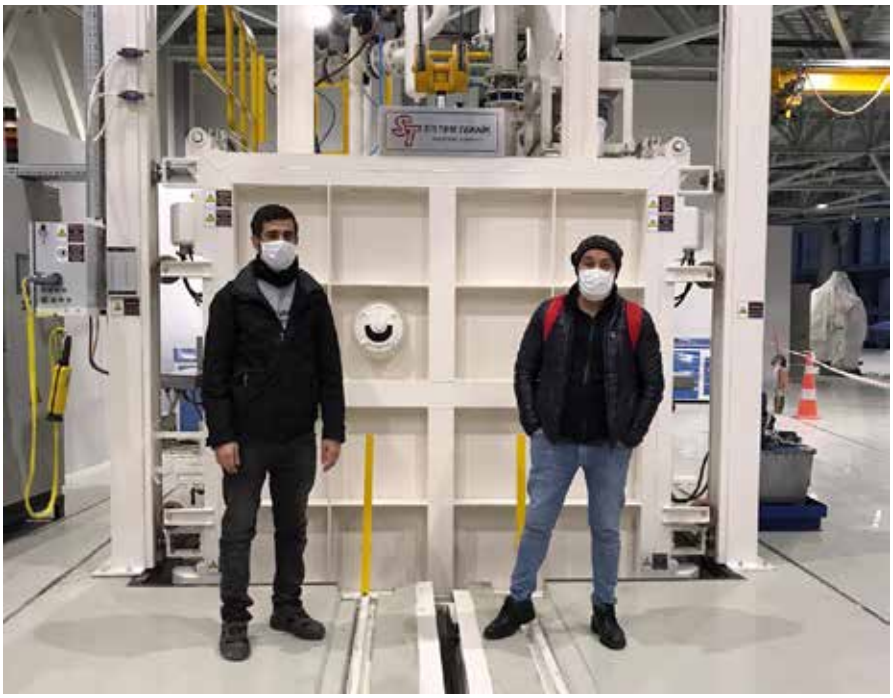
Sistem Teknik has passed to the second phase of Dubai Fire Test Furnace Laboratory furnace installations. The facility is the largest fire test center in the United Arab Emirates.

The second phase of the Dubai Fire Test Furnace Laboratory's furnace installations, which started under pandemic conditions and whose mechanical installation phase was completed on January 24, started on February 28. In the second phase, the cabling process will be completed and the test phase will be started with software controls. The facility, which consists of 3 main furnaces, curtain hood systems and load units, will be the largest fire test center in the United Arab Emirates when the installation is completed.

FURNACE INSTALLATION IN AZERBAIJAN HAS BEEN COMPLETED

Sistem Teknik has completed its work in Azerbaijan and the furnace has been delivered to the end user.

Sistem Teknik team has completed the installation of a vacuum drying furnace in the facility where high-speed train engines in our neighboring country Azerbaijan will be maintained. After all the heating, vacuum and reporting controls after the mechanical and electrical installation, the final acceptance was made and the furnace was delivered to the end user.



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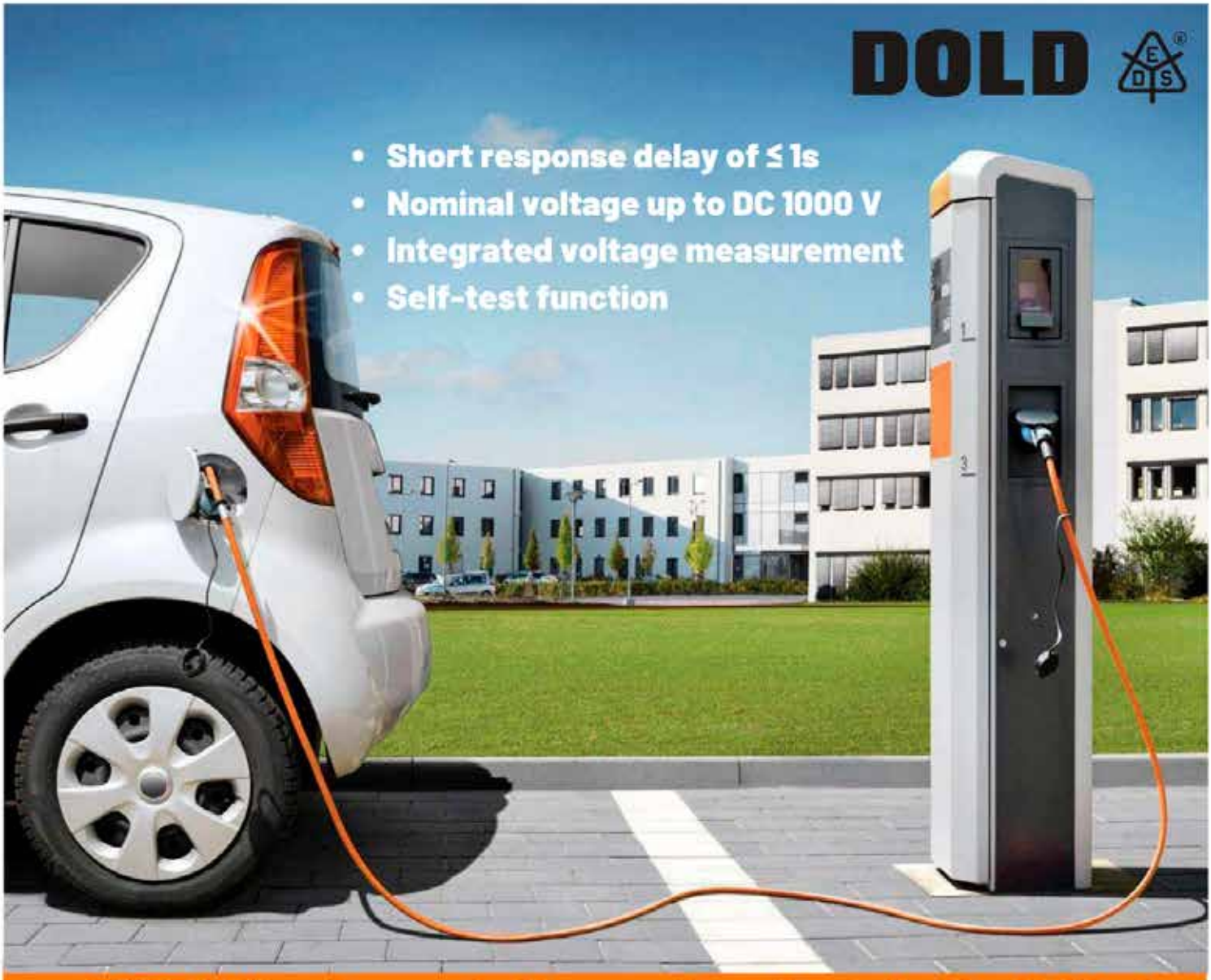
DOLD



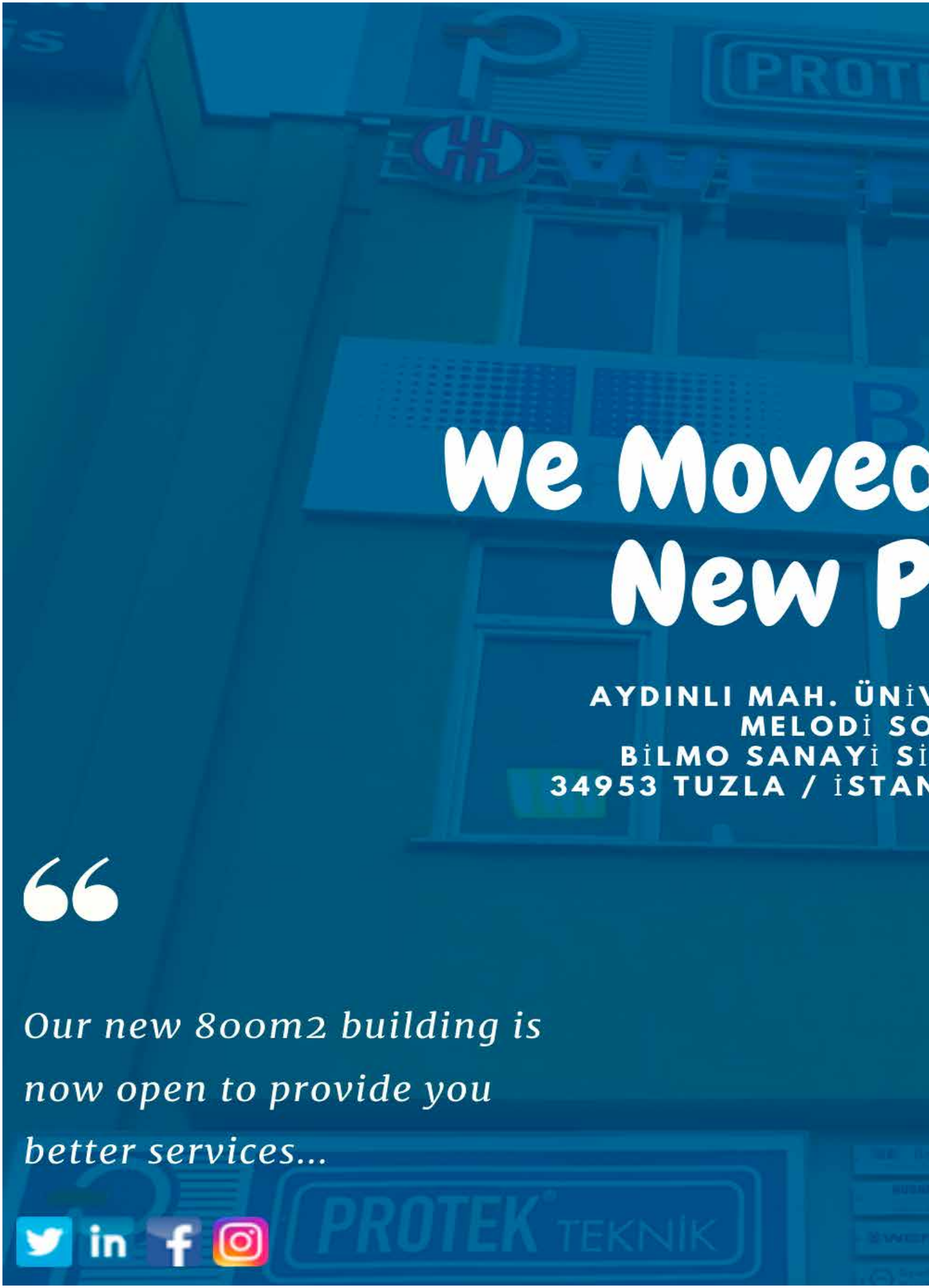
E-Mobilite of our solutions and products in the field of insulation and differential current monitoring - from the charging station to the electric vehicle.

For battery charging of electric vehicles at public charging stations, standardised protective measures must be observed. Residual current protective devices (RCD) are used for this purpose. With the DOLD residual current monitors (RCM) fault currents are displayed and critical operating states are signalled at an early stage. This means that preventive maintenance and repair measures can be initiated. The differential current measurement is carried out via an external current transformer. The RCM are also available as printed circuit boards for integration into existing assemblies.

In addition to monitoring DC charging stations, the insulation monitor RN 5897 can also be used to monitor unearthed AC, DC, AC/DC systems, UPS systems, systems with frequency converters or DC drives, battery networks and mobile power generators.

The insulation monitor RN 5897/020 of the VARIMETER IMD family is used especially for DC charging stations according to the IEC/EN 61851-23 standard and monitors the charging process from the charging station into the vehicle. The device is characterised by the short response delay of ≤ 1s, a nominal voltage up to DC 000 V with an additional ballast unit and the detection of asymmetrical as well as symmetrical insulation faults. The integrated voltage measurement ensures reliable determination of the insulation resistance in the IT system. The insulation monitor also has a self-test. This takes place automatically after power-on and after every full operating hour.

PROTEK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PHD-4 PORTABLE LEAK DETECTOR FOR TESTING UNDERGROUND STORAGE TANKS

Leak Testing for Underground Storage
of Hazardous Materials

Şekil 1 . Vakum Sementasyon ve Yüksek Basınçlı Gaz ile Sertleştirme Fırını

Leaks in underground gasoline and fuel oil tanks are a danger to the environment especially if leaking fuel enters local water supplies. To avoid environmental damage, countries worldwide are instituting legislation restricting the level of leaks allowed to emanate from underground tanks.
To protect the environment and to avoid the liability costs associated with non-compliance with environmental legislation, it is very important to find and repair leaks quickly.
The average cost to clean up a simple tank leak is very high and increases with the size of the leak. One way to minimize the danger and expense of leaks is to find them when they are very small. This requires a high degree of sensitivity and reliability in the leak detection method, one that both identifies and locates leaks precisely. The PHD-4 does both. This eliminates the need to excavate the area around an entire tank to fix a leak that may only be in the piping.

What Is PHD-4?

The PHD-4 is a self-contained, ready-to-use portable leak detector capable of detecting helium concentration as small as 2 parts-per-million.

• Why Helium?

Due to the low concentration of helium in the atmosphere (only 5 ppm), very small leaks can be detected.
Helium is non-reactive with other chemicals.
Helium as a tracer gas is advantageous because it is non-toxic, non-flammable, inexpensive, and quickly diffuses through small leaks.

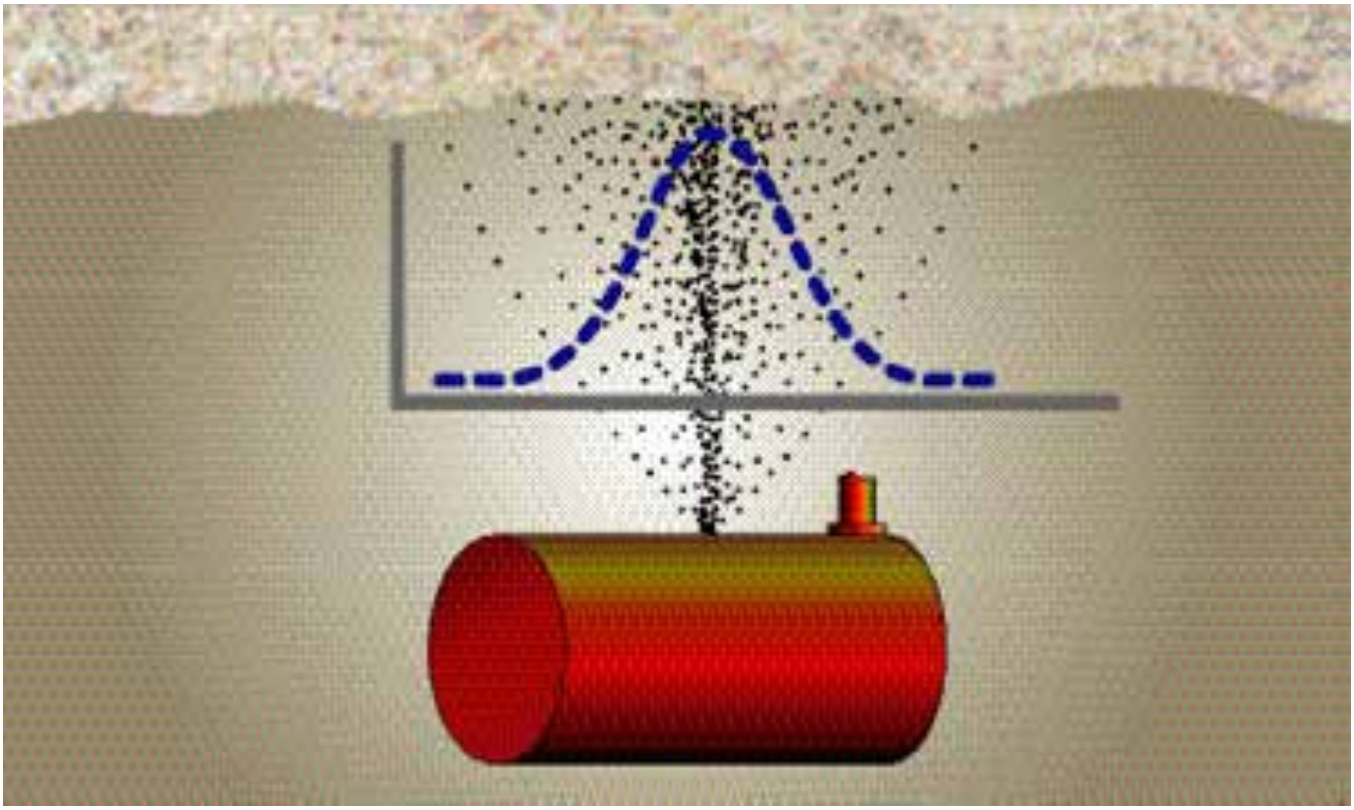
• Easily permeates earth and asphalt.

1- Leak Detection At Initial Installation
2- Post Installation Leak Detection

• Leak Detection At Initial Installation

Leak detection during initial installation is usually easier to accomplish because most or all components of the UST are readily accessible. Today, most new installations consist of primary and secondary containment systems. Tanks are typically double-walled and piping runs consist of an inner primary pipe and outer secondary pipe. Product leaking from the

> One way to minimize the danger and expense of leaks is to find them when they are very small. This requires a high degree of precision and reliability in the leak detection method that both pinpoints and detects leaks.



primary pipe is caught by the secondary pipe. Since piping runs are pitched back toward the sump area, any captured product flows in that direction to help insure containment.
Generally, testing of the tank top and piping in a new installation proceeds as follows:
• Adequately seal all tank and piping penetrations.
• Apply helium flow to one end of the system and monitor helium flow at the opposite and farthest end of the system to insure flushing of the ambient air within and to make sure that helium has reached all components.
• Seal the downstream penetration and pressurize the system with welding grade helium.
Although higher total pressures will increase the flow rate at leak sites and make smaller leaks easier to detect, one hundred percent helium is not necessarily required. Once the system is flushed and helium is added, the total pressure can be increased with air or nitrogen. When testing the primary piping using the PHD-4 helium "sniffer", the secondary piping can often be used to help contain any leaking helium. An accumulation effect occurs, making detection easier. In these cases, once the primary system is found to be leak free, the secondary piping can be sealed. Then, using a similar process, this secondary containment area, the interstitial space between pipes, can be flushed, pressurized with helium, and checked for potential leaks.

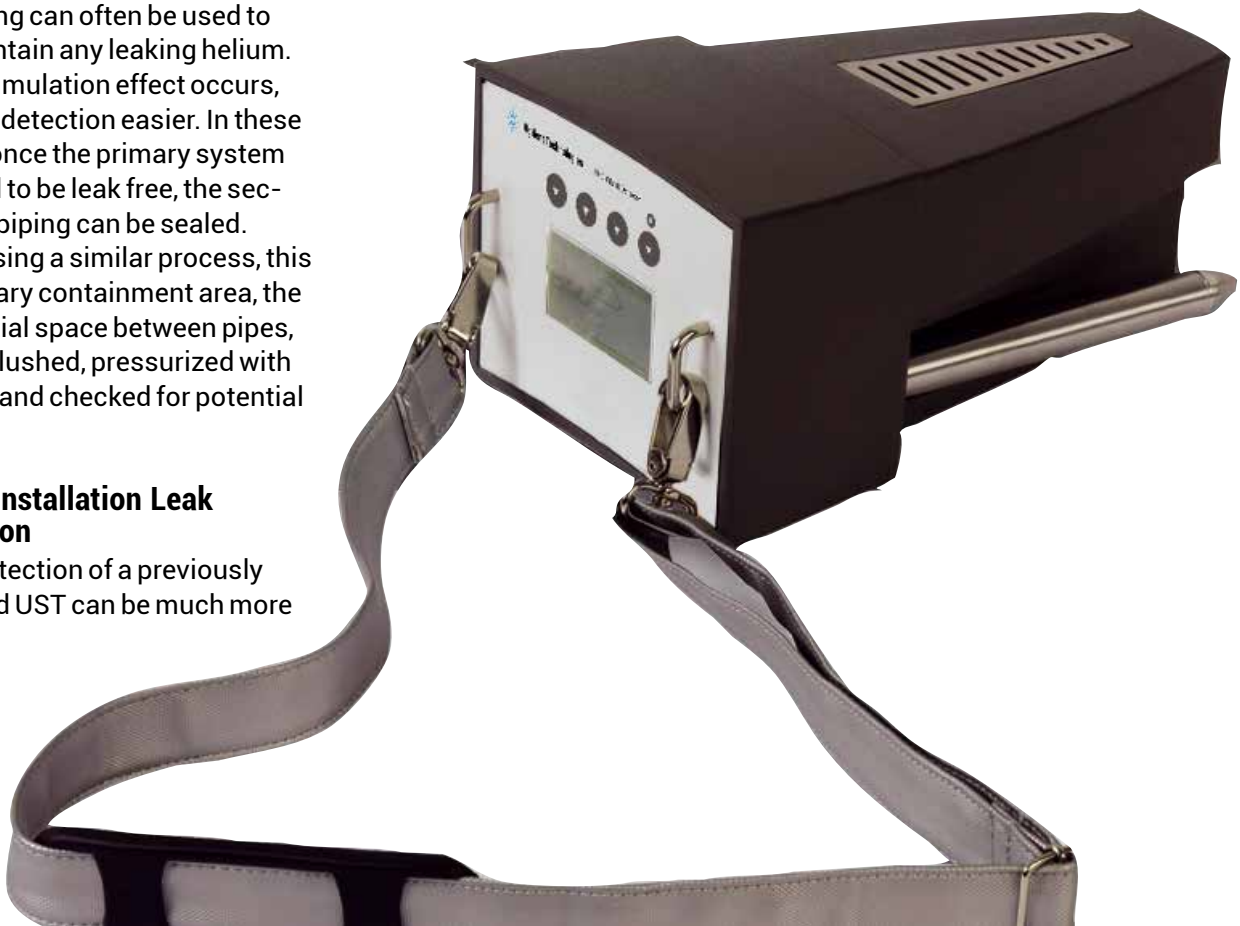
• Post Installation Leak Detection

Leak detection of a previously installed UST can be much more challenging since the tank and most of the piping are less accessible. These sites also typically have a layer of concrete or asphalt at the surface. The system must be flushed of air and pressurized with helium as described earlier, and leak detection must be performed through the layers of dirt, sand, gravel, concrete, etc.
Helium will pass through all substrates but will not always follow a straight-line path to the surface. To aid in finding the precise location of the leak site, holes may be drilled through the concrete at regular intervals along and directly over the piping runs. Once pressurization and a short dwell time are accomplished, the PHD-4 probe is placed at each of these holes to determine the approximate location of the leak.
Tape or some other material is placed over the hole during the dwell period to permit an accumulation effect and make the detection method more sensitive. Proper execution of this method can significantly reduce the amount of excavation required to repair leaks at an existing UST site.

• Neden PHD-4 ?

High Selectivity PHD-4 is sensitive only to helium. There are no false signals due to the presence of any other gases.
High Sensitivity PHD-4 is nearly as sensitive to small leaks as a more expensive mass spectrometer leak detector used in the sniffing mode. This allows precise location of the leak which helps minimize excavation costs.
Battery Operated PHD-4 can be operated without a main power supply or power generator. Up to 4 hours on a single charge.
Simple Operation PHD-4 is very easy to use and does not require any special operator training. All the active menus of the PHD-4 are available in four languages. Specifically designed for underground testing (see sampling probe in photo on page 3).
Very Low Maintenance Replacement of sampling line filters is straightforward and requires only a screwdriver.
Portable PHD-4 is lightweight, portable and easy to carry, even to the most difficult leak check locations. It weighs only 2.6 kg.

Torrvac Mühendislik A.Ş
T : +902166064067



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

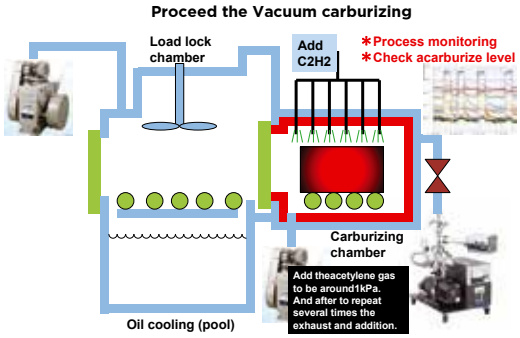
It is used to determine flammable gas as a percentage in fire, hazardous industries.

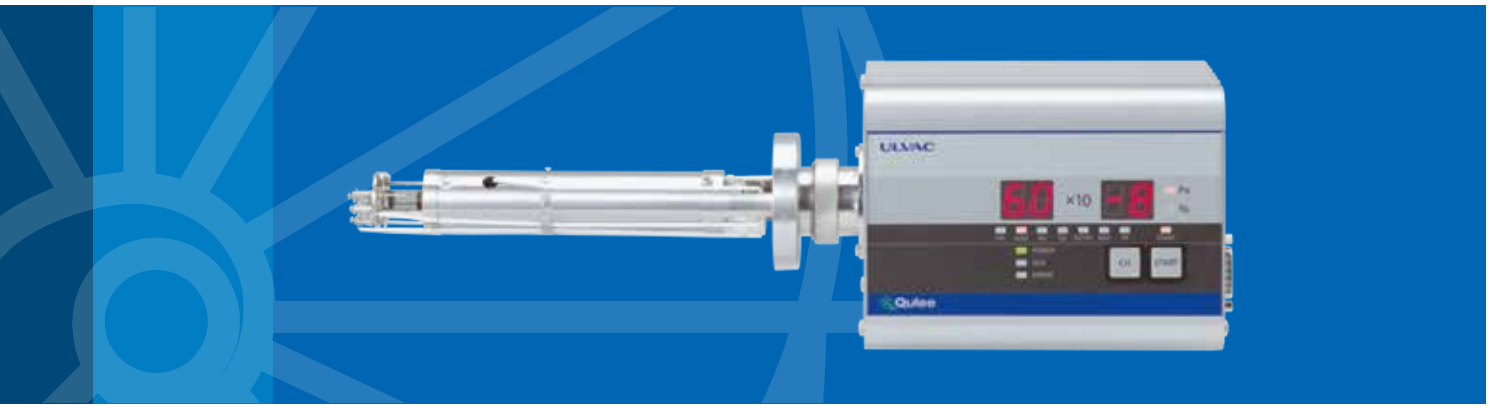
Qulee Basic Gas Monitor

"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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