

INDUSTRIAL

S I S T E M T E K N I K I S S U E

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# WE HAVE BEEN SELECTED THE MOST SUCCESSFUL COMPANY OF THE YEAR



Our dear readers,

I would like to start the preface of this issue with a news that makes us very happy. Every year, a survey is conducted across Kocaeli, in which the most successful companies in each sector are selected. As Sistem Teknik Sanayi Fırınları A.Ş., we have been selected as the "Most Successful Industrial Company of the Year" in the most successful company selection survey. We are proud and happy. They made an interview with me on this subject in Kocaeli Newspaper and published it in the media. You can read our interview in this issue of our magazine with the thought that it may be of interest to you. We know that there are many companies in Kocaeli that are much more successful than us, but also much bigger. I attribute our being chosen among them to our R&D studies and the fact that we have announced what we have done more successfully to our target audience. I believe that, in addition to social media, our Furnaces News magazine, which you hold in your hands, also contributed greatly to this success.

One of the most important decisions we made at the beginning of the pandemic was the idea of publishing a magazine with both news and technical content in order to maintain our relationship with our customers, suppliers and employees. When I look back, I see how much we did in the last year in the previous issues of our magazine; I am happy. On this occasion, I wish you happiness and success, especially health.

**Mehmet Özdeşlik**

**Sistem Teknik A.Ş.**

**Grup Yönetim Kurulu Başkanı**

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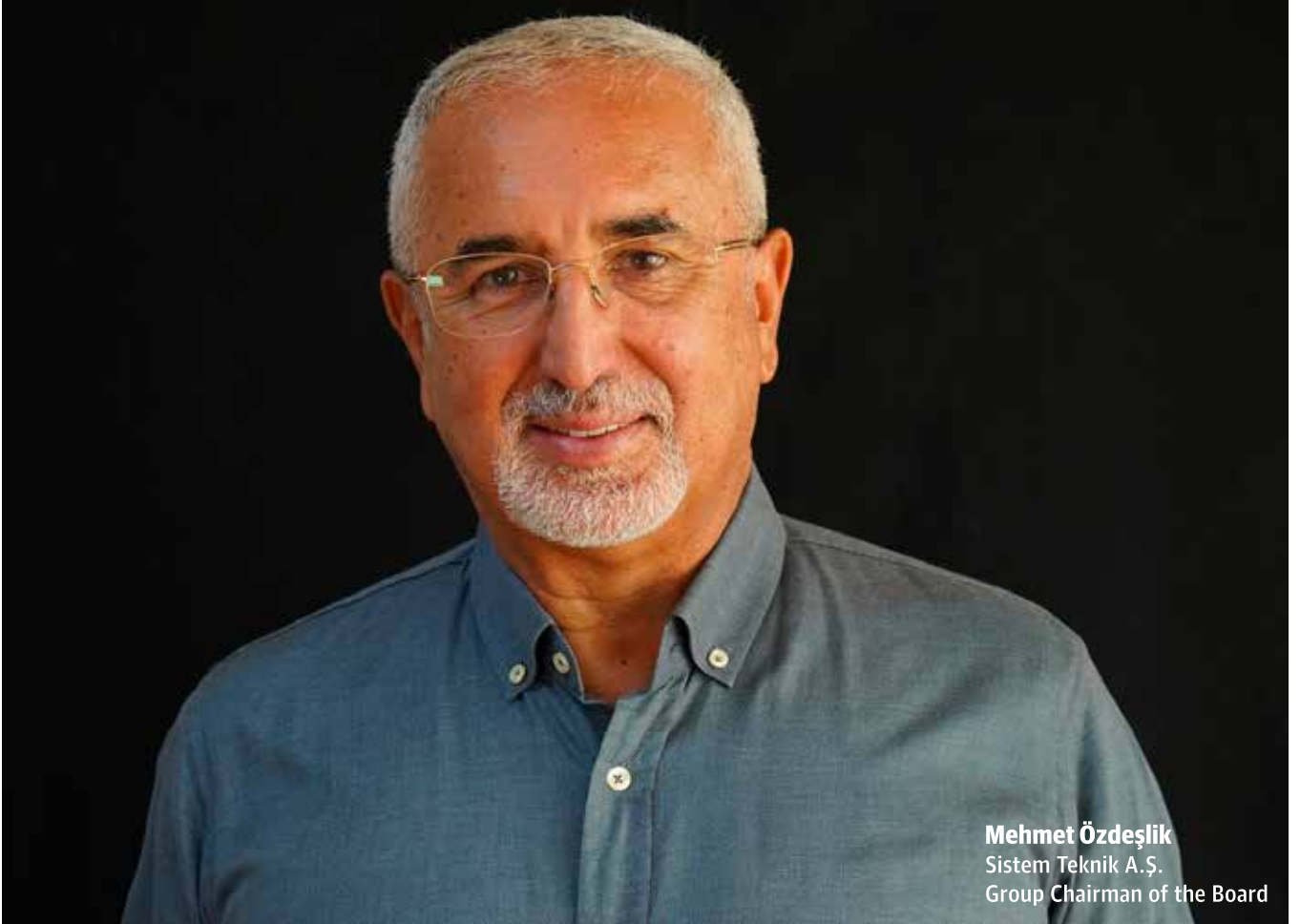
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# “DESPITE THE PANDEMIC, WE INCREASED OUR EXPORTS TO 73 PERCENT”

Sistem Teknik increased its exports to 73 percent despite the pandemic. Mehmet Özdeşlik, Chairman of the Board of Sistem Teknik, who answered our questions sincerely, explained this success and addressed the youth by giving the secret of success: Never give up on your dreams!



**Mehmet Özdeşlik**  
Sistem Teknik A.Ş.  
Group Chairman of the Board

**E**very year, the best of the business world is selected by Koçeli Newspaper. The people and institutions awarded with a ceremony are actually the people who are at the top with the value they have and what they bring to our country. And they not only contribute to the country's economy and employment, but also inspire hope to young people by setting an example so that they can achieve much better and never give up on their goals. One of the exemplary companies is Sistem Teknik.

We are proud and happy to be selected as the “Industrial Company of the Year” in the Doruktakiler 2020 evaluation. Mehmet Özdeşlik, Chairman of the Board and the name behind our success, received our award on behalf of us. We would like to hear from him both this magnificent success and Sistem Teknik. Saying that Sistem Teknik has increased its exports to 73 percent despite all the harsh conditions and uncertainties of the pandemic, Mr. Mehmet has a message for the youth. Let's not prolong it any longer

and leave the word to Mr. Mehmet now. Enjoy reading!

**Mr. Mehmet, first of all, we would like to thank you on behalf of the entire Sistem Teknik team. Your effort in this success is endless. We would like to start our interview by first introducing you to our readers. Could you briefly tell us about yourself?**

In 1979, together with Orhan Obalı and Erdoğan Yetişken, we founded Sistem Teknik. Since its establishment, I have been the General Man-





# Technology for Tube Heat Treatment

*Since 1979 ...*



ager and Chairman of the Board of Directors at Sistem Teknik. At the beginning of 2021, I left the responsibility to the second generation. Currently, I am only Chairman of the Board of Sistem Teknik. Apart from Sistem Teknik, my social responsibility studies continue. I am the founding president of the Industrial Bakery Industrialists and Businessmen's Association (EFSIAD), which is the sole representative of the industrial furnace sector. I am also the President of the Kocaeli Chamber of Industry 23rd Professional Committee.

### **We are one of the most well-known companies worldwide"**

**Mr. Mehmet, can you briefly describe Sistem Teknik? What would you like to say to our readers who have just met us and want to hear from us?**

Sistem Teknik Sanayi Fırınları A.Ş. manufactures heat treatment and process furnaces for industries such as automotive, aerospace, defense industry, iron and steel, and casting. We are one of the most well-known companies worldwide in the production of automotive and rail systems suspension elements, heat treatment furnaces and fire resistance test furnaces. Apart from this, we are very successful in vacuum furnaces, especially for the aerospace and mold industry. We also have important patents in this field. We operate

in TOSB OSB in Çayırova with our 42 years of experience and an experienced staff of approximately 110 people. We have 8 thousand square meters of indoor and 2 thousand square meters of open space.

### **Can you share your thoughts about our R&D projects?**

Of course. We are also the R&D center. To talk about our new R&D projects, we continue to work on LPC (Low pressure Carburizing), the newest technology in special steel heat treatment. We have developed our vacuum oil hardening furnace, which is crucial for a wider range of steels and LPC. We have come to an important point in coating furnaces with the thermo diffusion method, which aims to increase the corrosion resistance of automotive parts and fasteners in the most environmentally friendly way without using acid, to reduce the weight of the part and to extend its life. We received a new request from our customer in America, to whom we sent our first prototype.

A facility that will carry out a similar operation will soon be commissioned in the company of Çinkosan.

For a year now, we have been carrying out very serious R&D studies on microwave and hybrid furnaces, which are solutions for effective and economical drying and curing in many sectors from food to wood industry, insulation material production.

### **More than half of the production is exported.**

### **Let's talk a little bit about exports. What percentage of the production do you export?**

We have been exporting since 1994. Since the 2000s, we have been exporting 40-60% of our production. In 2020, our export rate was 73 percent under pandemic conditions. When we started exporting, we had chosen Germany as the target with the idea that if we could sell it to Germany, we could sell it anywhere. It was not easy to sell industrial furnace to a country like Germany, which has very strong competitors and is ex-

**“According to Mehmet Özdeşlik, there are two secrets to success. The first is to prioritize customer satisfaction, and the second is employee satisfaction. If these happen, success comes by itself, in his own words.”**





# When was the last time you did **PREVENTIVE MAINTENANCE** for your furnace



By periodical maintenance you can

- ▼ Prevent unexpected downtimes
- ▼ Decrease in operational costs
- ▼ Increase in production capacity
- ▼ Provide necessary spare parts on time

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tremely nationalistic about using its own machines, but in the end, we sell furnaces to organizations such as Continental, Isover, TÜV, Siemens.

### Which countries are exported to?

Today, Germany and Western Europe are our biggest export markets. Apart from that, Russia, Ukraine, United Arab Emirates, China, India, America, Mexico, Brazil are among the countries which we export to. We have experienced this pride by being among the giants of the world.

### Finally, we would like to ask about the Pandemic, which has been at the center of our lives for more than a year. How did the pandemic process go for Sistem Teknik and what measures were taken?

The furnaces we produce are investment goods and their production

takes at least 5 months, sometimes 1 year. When the pandemic started, the risk of investments stopping for a while and not being able to see ahead made us very nervous. We tried to stay financially liquid. The health of our staff was very important. For this, in addition to hygiene, social distance and mask measures, we have implemented partial working from home measures. There were also periods when we were completely shut down and worked at 50 percent capacity to reduce the intensity. Apart from this, we continue to have difficulties in sending staff abroad due to travel restrictions and visa problems. As a solution, we prepare very detailed assembly plans and try to do our assembly with local teams. We are commissioning our facilities by sending critical personnel from Turkey.



## "OUR BIGGEST SUCCESS IS FURNACES NEWS MAGAZINE"

Mehmet Özdeşlik, our Chairman of the Board described his greatest achievements in 2020 with the following words: "In 2020, we evaluated the periods of total closure by giving online trainings to our employees. We have taken great strides in integrating the 'Lean Manufacturing' approach, which is indispensable for digitalization, into our company. But I think our greatest achievement has been the launch of Furnaces News Magazine. Our magazine is published every 3 months, and all issues are available digitally on the website [www.sistemteknik.com](http://www.sistemteknik.com). The feature of our magazine is that it contains important technical information and is an important communication channel with our customers."



# Technology, for iron & steel sector

*Since 1979 ...*



# ENDO GAS ATMOSPHERES

Alper KELEŞOĞLU, Cansu YILMAZ

**P**rotective atmospheres in industrial furnaces have different chemical compositions to prevent or allow the reactions that may occur in these materials depending on the material to be subjected to heat treatment and the heat treatment to be performed on it. In this context, protective atmospheres can

consist of inert gases or gas mixtures that do not react, as well as it can consist gases with high carbon potential. In Table 1, the effects of gases used as protective atmospheres in the heat treatment industry on different metals are given. (Note: The effect of atmospheric gas on steel varies according to the carbon per-

centage of the steel. This situation can be seen in Figure 1.). In the table; O: Oxidizer, K: Carburizer, DK: Decarburizing, R: Reducer and -: It means no effect.

Usage areas of endogas atmospheres are listed below [2].

1) Bright hardening of steels with

| Metal      | O <sub>2</sub> | CO <sub>2</sub> | CO    | H <sub>2</sub> | CH <sub>4</sub> | H <sub>2</sub> O | N <sub>2</sub> | Ar | Hc |
|------------|----------------|-----------------|-------|----------------|-----------------|------------------|----------------|----|----|
| Iron       | O              | O               | K     | -              | K               | O                | -              | -  | -  |
| Steel      | O; DK          | O; DK           | K; DK | DK             | K               | O; DK            | -              | -  | -  |
| Aluminum   | O              | O               | -     | -              | -               | -                | -              | -  | -  |
| Copper     | O              | O               | -     | -              | -               | -                | -              | -  | -  |
| Iron Oxide | -              | -               | R     | R              | R               | -                | -              | -  | -  |

Table 1. Effects of Atmospheric Gases on Some Metals [1]

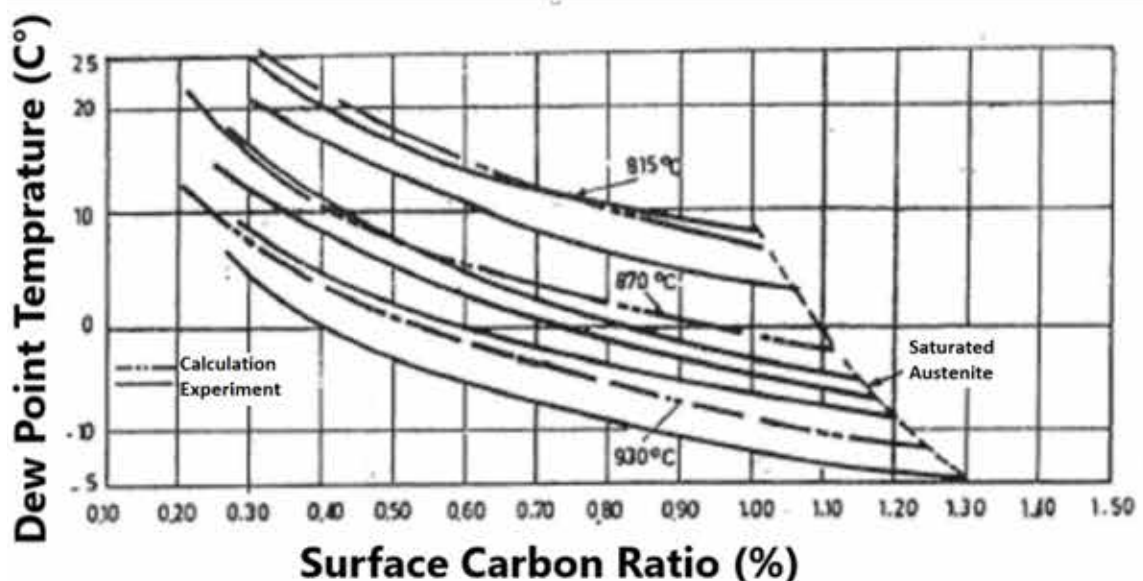


Figure 1. Balance Between Carbon Steel-Endogas Atmosphere [2]



different carbon percentages without carburizing or decarbonizing, 2) Annealing and normalizing of carbon percentage steels without scaling, carburizing and decarburization, 3) Bright copper welding or silver welding of different carbon steels without decarburization, 4) Carbon balancing of decarbonized forged or bar steels, 5) Sintering of medium and high carbon metallurgical steels that are most likely to decarbonize and require a reducing atmosphere, 6) Use as carrier gas in gas carbonation and carbonitration processes. Endogas atmospheres are gathered from the reaction of air-fuel mixtures under high temperature by means of nickel-based catalysts in an externally heated stainless steel reactor. These types of atmospheres are produced by rapid cooling in order to prevent soot and carbon dioxide formation after complete or partial reactions in the reactor, depending on their usage areas. Endogas atmospheres are suitable for protecting most steels that are subjected

to heat treatment in the furnace against oxidation and decarburization, are easy to manufacture and have a stable structure that can be kept constant in chemical composition. However, they have disadvantages such as carbon release at low temperatures since they create an explosion hazard when mixed with air due to their high desire to react with chromium (because it contains high levels of CO and H<sub>2</sub> in its composition). In the production of endogas atmospheres, the fuel-air mixture to be added to the reaction is added to the reaction by measurement in a way that does not generate carbon dioxide and water vapor, but only releases carbon monoxide and hydrogen. The chemical compositions of the poor and rich endogas atmospheres are given in Table 2. According to the table, it is seen that the carbon monoxide percentage of the endogas to be obtained from propane is higher than the natural gas ratio but lower than the hydrogen percentage. Depending on this situation, the dew point tem-

perature of the endogas obtained from propane (-15... 10 °C) is lower than that of natural gas (-5... 10 °C). The gas composition produced by the endogas generator can be determined by means of the sample gas flow taken from the generator outlet which subjected to the three gas analysis devices, thus determining whether the atmosphere is of the desired quality or not. The values to be determined in the three gas analysis devices must meet the values given in Table 2, and in addition, the C% value which express the carbon potential, must be between 0.3-0.4. It is recommended to continue the measurements to be made with three gas analysis devices for at least one hour and make sure that the endogas atmosphere to be produced is stable. The quality of the endogas atmosphere supplied to the furnace can be kept under constant control and monitored with the dew point sensor, infrared sensors used to determine the composition of different gases, and oxygen probes [3].

| Atmosfer Tipi  | Nominal Combination (%Volume) |      |                 |                |                 |                  |
|--|-------------------------------|------|-----------------|----------------|-----------------|------------------|
|  | N <sub>2</sub>                | CO   | CO <sub>2</sub> | H <sub>2</sub> | CH <sub>4</sub> | H <sub>2</sub> O |
| <b>Stoichiometric Endogas (Natural Gas Sourced)</b>  | 40                            | 20   | -               | 40             | -               | -                |
| <b>Endogas Practically Obtained from Natural Gas</b> | 39                            | 19,8 | 0,1             | 40,4           | 0,5             | 0,2              |
| <b>Stoichiometric Endogas (Propane Sourced)</b>      | 44,9                          | 23,6 | -               | 31,5           | -               | -                |
| <b>Endogas Practically Derived from Propane</b>      | 45,3                          | 23,4 | -               | 31,1           | 0,2             | -                |
| <b>Poor Endogas</b>                                  | 45,1                          | 19,6 | 0,4             | 34,6           | 0,3             | -                |
| <b>Rich Endogas</b>                                  | 39,8                          | 20,7 | -               | 38,7           | 0,8             | -                |

 Table 2. Chemical Compositions of Endogas Atmospheres [2]

After the fuel-air mixture is compressed to a pressure of 60... 150 mbar, it is passed over the catalyst in a sealed reactor (catalysts used in the production of endogas are generally nickel oxide impregnated porous refractories). This reactor is

heated externally with hydrocarbon-based fuel or electricity. As can be seen in the Equation 1 (situation where natural gas is used as fuel), the reactor temperature should be between 985... 1010 °C to obtain an atmosphere with a fully reacted,

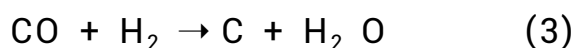
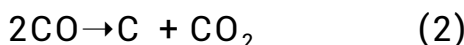
stable chemical composition and to keep the catalyst activity at maximum level. In order to provide this temperature, the external heating temperature of the reactor should be between 1040... 1090 °C.



As can be seen from the above reaction, the total number of moles of the inflow is 6.8 moles, and the number of moles of the outflow is 9.8 moles. In this case, as a result of using the % volume ~ mole% relations valid for the reaction kinetics, it is seen that an endogas production of 1.44 times the volumetric flow of the incoming fuel-air mixture will occur. In this case, if natural gas is used as fuel, it can be said that the ideal air-fuel ratio is 2.4. However, since natural gas does not consist of 100% CH<sub>4</sub>, it is usual to observe some deviations in the above mentioned calcula-

tions. Accordingly, it is quite natural that the endogas volumetric flow rate produced is 1.35 times instead of 1.44 and the air-fuel ratio is observed as 2.6 instead of 2.4. Propane or butane can also be used as fuel in endogas generators instead of natural gas. However, if these gases are used, care should be taken that the propylene or butylene ratio in the fuel does not exceed 5%. Otherwise, such unsaturated hydrocarbons will cause carbon formation on the catalysts. If propane is used as fuel, similar to natural gas, the endogas flow to be obtained

will be 1.55 times the total flow of the incoming fuel and air mixture. The ideal air-fuel ratio would be 7.2. However, due to impurities in the fuel, this ratio is generally observed in the range of 7.5... 8 in practice. When the desired conditions are met in the reactor, then it must be cooled rapidly to a temperature below 320 °C, in order to prevent the unstable carbon monoxide formation at the exit of the reactor from turning to carbon dioxide-water vapor with the reverse reactions given in Equations 2 and 3.



The reverse reaction given above usually takes place between 485... 700 °C.

The chemical reaction that takes place in endogas generators is an exothermic reaction, in contrast to the name of the atmosphere. How-

ever, the reactions in the generator take place in two separate stages. In the first stage, some of the fuel in the fuel-air mixture burns, releasing carbon dioxide, water vapor and also heat besides. In the second stage, the excess fuel remaining from the

combustion reaction and the water vapor and carbon dioxide produced in the first stage enter an endothermic reaction. For example, the reaction that takes place in the case of natural gas is given in Equation 4.



However, since this reaction cannot take place in the reactor with 100% efficiency and water vapor is a strong decarburization element, it must be eliminated while still in the catalyst. Therefore, a very high temperature, clean and uncontaminated catalyst is required to produce a fully reacted gas and remove carbon dioxide, excess fuel and water vapor (what is meant by a producing a fully reacted gas is the complete reaction that can be achieved in practice and indicates that there is unburned fuel in the range of 0.4... 0.8% in the en-

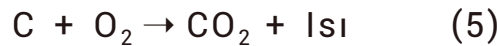
dogas atmosphere produced). If the desired temperature range cannot be achieved in the reactor, the complete reaction does not take place and carbon accumulation begins on the catalyst. Carbon accumulation causes deviations in the desired endogas atmosphere chemical composition by reducing the efficiency of the catalyst, and the formation of unwanted gases such as water vapor and carbon dioxide increases in the environment. As a result of this situation, the desired carbon potential cannot be achieved

in the process of generating the endogas atmosphere and it becomes difficult to maintain the atmosphere stability in the furnace where the atmosphere is fed. On the other hand, with the increase of the amount of fuel that does not break down, the rate of fragmentation of this fuel in the furnace increases and causes excessive carbon release on the material. In order to prevent this situation, regeneration process is applied in endogas generators. Thanks to the regeneration process, the carbon accumulated in the catalysts and

reactor walls is removed as a result of the reaction shown in Equation 5 with oxygen. During the regenera-

tion process, the temperature of the reactor is 815°C and air is fed by an external blower not less than 60 lt/

min depending on the capacity of the endogas generator.



Furnace atmospheres with 5% or more flammable gases (H<sub>2</sub>, CO, CH<sub>4</sub>) are potential sources of fire and explosion. These atmospheres must be prevented from being taken into the furnace below 760 °C or falling below this temperature in the furnace. In order to ensure complete safety during the cooling cycle of the furnace, these atmospheres must be completely exhausted with inert gases in accordance with the EN 746-3 standard before the furnace temperature is reduced below 760°C. Flammable atmospheres should be incinerated at the furnace exit if possible and evacuated out of the working zone.

It is essential to throw them out from the working zone, otherwise even if they are not flammable or toxic, they have the potential to significantly reduce the oxygen in the space. Situations such as the change in the heat treating load in the furnace and the opening and closing of the furnace door directly affect the atmosphere inside the furnace. As a result of this situation, the gas generation load in the endogas generator also changes therefore the air-gas ratio and flow rates in the generator must be kept under constant control in response to this changing load. The control process can be provided by advanced

automatic control devices such as an endo-injector, or it is possible to perform this operation manually using variable area flowmeters. From the economical side, the endogas generator should not be operated less than half capacity.

Sistem Teknik Industrial Furnaces manufactures endogas generators which can produce endogas atmosphere with natural gas and propane feeds and have options for heating either with electricity or gas with a capacity between 25-100 m<sup>3</sup>/h (Figure 2), in accordance with the EN 746-3 standard.



Figure 2. Sistem Teknik Endogas Generators

## References

- [1]- Nemenyi, D. 1984: Controlled Atmospheres for Heat Treatment 1st Edition. Pergamon Press, Southampton, Great Britain.
- [2]- Çiğdemoğlu, M. 1970: Furnace Atmospheres and Carbon Control. Machanical Engineering Chamber Press No:52, Ankara, Turkey.
- [3]- Harring, H.D., 2009: Considerations in Heat Treatment (Part Two: Furnace Atmosphere Control), Industrial Heating, 47-49.



# EXPORT ATTACK TO THE WORLD BY MCA ENGINEERING

MCA Engineering, one of the most valuable engineering companies in our country, exports to all over the world with the competencies which it has today. MCA Engineering General Manager Can Özdirikman has explained the successful company, whose reputation exceeds the borders, from A to Z and described us as a "reliable partner" as Sistem Teknik team in this success.



**Can ÖZDİRİKMAN**  
MCA Engineering General Manager

**M**CA Engineering, which said 'hello' to the sector in 2015 and achieved great success in a short time, exports to all over the world from India to Egypt and Ivory Coast today. General Manager of the company, Can Özdirikman, has answered our questions about the successful company that meets the engineering needs of many sectors at domestic and abroad. The experienced name, who is passionate about his job, also talked about the process of crossing paths with Sistem Teknik. Özdirikman said, "Sistem Teknik has become one of the industry leaders of our country, as a global company that has implemented

dynamics parallel to the changing and constantly developing world economic growth and technical development, as well as its sectoral experience based on many years."

**First of all, thank you very much for accepting our interview offer. Could you briefly describe the services you provide as MCA Engineering?**

MCA Engineering, with its dynamic staff with international industry experience, follows the latest technologies and serves to meet the special needs of many domestic and international sectors such as engineering, machinery, molds and complete facilities. Our company

carries out the most meticulous work by following the developing technologies in all phases of the projects such as feasibility, design, production, quality control, commissioning and after-sales. Our goal is to produce reliable, functional and economical solutions for our customers. As MCA Engineering, we design and manufacture machines, lines and facilities especially for the metal forming industry that produces products such as LPG, Autogas, Forklift, Refrigerant Gas Cylinder, Fire Extinguisher, and Steel Wheel. At the same time, we create solution partnerships with many domestic and foreign machinery and plant manufacturers

who are branded in their sectors and create solutions focused on customer needs.

### Long years of cooperation with Sistem Teknik

#### So, how did your paths cross with Sistem Teknik? How did the idea of choosing Roller Conveyor LPG Heated Annealing Furnace come about?

When we started our first LPG tube production facility project, we decided to prefer Sistem Teknik, both in terms of references and domestic and foreign prestige, during our search for a manufacturer. The beginning of this beautiful union was about 12 years ago. With the continuation of our cooperation in the following years, we witnessed the right choice we made. In our turnkey LPG tube plant projects, we prefer roller conveyor annealing furnaces with stress relief and normalization options. The furnaces we use have been successfully designed and implemented by the engineering team of Sistem Teknik in accordance with the specific requirements of each project.

#### What has changed with your preferred Roller Conveyor LPG Heated Annealing Furnace?

Heating of the lower and upper parts of the LPG cylinders homogeneously during the firing, and therefore very healthy output values of the critical process, performing both normalization and stress relieving processes in the same furnace with a special design, reaching high production capacities, a very well designed roll system and roll drive system, lastly, the operation of the furnace with almost minimum failure for many years, the healthy realization of the process, as well as the energy efficiency and environmental friendliness of the furnaces add a great advantage to the production facilities we have established.

**Sistem Teknik is among the industry leaders of our country.**



**"Furnaces used by MCA Engineering bear the signature of Sistem Teknik. The furnaces were designed and implemented in accordance with the specific requirements of each project."**

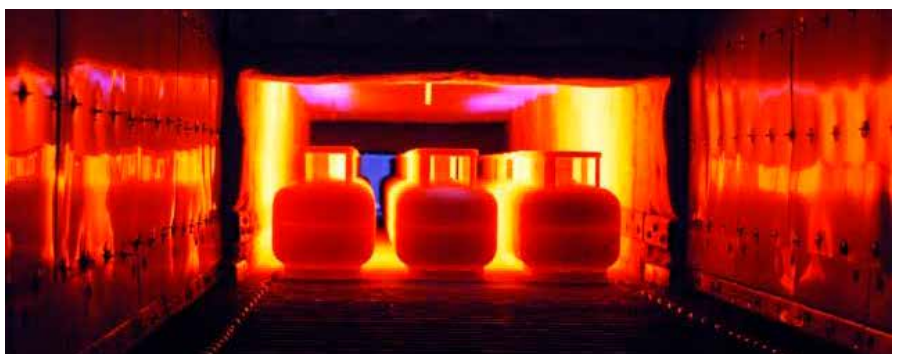
#### In this context, we would like to hear from you about the importance of the service you receive from Sistem Teknik in the functioning of your company.

The inclusion of Sistem Teknik as our solution partner in all our turnkey production facility projects gives our international customers a special confidence and thus supports our sales strategies. Sistem Teknik has become one of the industry leaders of our country as a global company that has implemented dynamics parallel to the changing and constantly developing world economic growth and technical development, as well as its sectoral experience based on many years. It has become a reliable partner for its customers with its strong engineering staff, especially the R&D

department, quality production and service.

#### 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?

With the dynamic staff and project management system we have established, we have had a very busy and productive period by turning all the negative conditions that we encountered during the pandemic period in our favor. It is our biggest goal to continue to successfully announce the name of both our company and our country by signing many prestigious international new projects in the coming years, using the new experiences we have gained from this process.



# BOLT MANUFACTURER THAT CHALLENGES CENTURIES: BERDAN BOLTS AND NUTS

There are some companies that set an example by challenging the centuries. Berdan Bolts&Nuts is one of those companies. Combining years of experience with its superior technological infrastructure, Berdan Civata is crowning its success by increasing its investments together with Sistem Teknik.



**Tuncay Canbakan**  
Berdan Civata  
Isıl İşlem Proses Lideri

**B**erdan Bolts&Nuts, which was established in 1979 to meet the needs of domestic and international companies for fasteners of all types and quality, such as standard and special bolts, nuts, studs and anchors, is one of the oldest and most successful bolt manufacturers in Turkey with its nearly half a century of experience and technological infrastructure. Berdan Bolts&Nuts, which started its activities in a workshop, contributes to both the national economy and employment with its more than 400 employees. Heat Treatment Process Leader Tuncay Canbakan, emphasizing that they continue their investments in order not to fall behind their competitors in the world even under pandemic conditions, has said with pride and happiness, "Berdan Bolts&Nuts has contributed to the country's economy by increasing its personnel employment by 20%

during the pandemic period. Always breaking new ground in Turkey, Berdan Bolts&Nuts has achieved and continues to achieve a quality and customer-oriented approach with its 402 employees, 58 of whom are engineers, who are university graduates, in mega projects such as Izmit Crossing Bridge and Çanakkale Bridge, as well as wind turbines.

## Success has increased every year

Tuncay Canbakan has expressed the historical development and growth process of Berdan Bolts&Nuts for our readers as follows: "After moving to its place in the organized industry, Berdan Bolts&Nuts has grown by targeting branding and quality. After the decision of our Chairman of Board, Master of Mechanical Engineer Hasan Şemsi, to establish an integrated bolt factory in 2008, the investments for the first Heat Treatment

and hot dip galvanizing facilities were realized. In the last months of 2008, a set of Heat Treatment furnaces including a chamber type atmosphere controlled second hand Heat Treatment furnace, 1 washing machine and 1 tempering furnace were purchased and installed.

## A capacity increase occurred with the Sistem Teknik furnace

In April 2009, all homogeneity and heat treatment preliminary tests were completed and put into use. The daily capacity of this oven is 2700 kg. Due to the increase in production and the increase in the need for heat treatment, the second chamber type thermal treatment furnace was commissioned in 2011. The daily capacity of this furnace is 2700 kg. In order to meet the increased production capacity in line with the demands of the customers, with the contributions



of Çukurova Development Agency, a continuous type heat treatment furnace with a capacity of 500 kg/hour was purchased from Sistem Teknik, and the heat treatment capacity was increased."

### **First in Turkey, from Berdan Bolts&Nuts**

Underlining that they met with wind energy companies as the only Turkish company that participated in the Husum Wind Energy Fair in 2011, Canbakan has said, "After this date, Berdan Bolts&Nuts produced the first wind energy bolts and anchor sets in Turkey for Alstom Company, focusing on the wind industry. In order to meet the anchor orders, it has incorporated 3-meter-long well type heat treatment furnaces. The heat treatment capacity of these furnaces is 9000 kg per day.

### **New investments are on the way**

Tuncay Canbakan stated that Berdan Civata, which has been the approved supplier of wind energy companies such as GE, NORDEX, SIEMENS, VESTAS over the years, purchased a chamber heat treatment furnace with a charging capacity of 1500 kg from abroad, of which Gökhan Lale is the representative, in 2019, in order to maintain its claim of quality bolt production, and he added that he installed it. In his own words, a second 1500 kg/charge capacity heat treatment furnace is ordered in the first months of 2020 and it is planned to be commissioned in the 10th month of 2021. The secret of Berdan Bolts&Nuts' success is that, in addition to providing high quality services, they never stop investing in technology and constantly follow innovations. Canbakan has said, "With the advancement of technology, all heat treatment furnaces within Berdan Bolts&Nuts' serve as plc controlled. The heat treatment data, which are calibrated according to the American SAE AMS 2750F standard, are recorded for 24 hours, and the graphs of all values that directly affect the heat treatment results such as carbon, furnace temperature, oil temperature, tempering temperature are recorded

instantly in line with the wishes of the customers. 4 Metallurgical and Materials Engineers, including one graduate engineer and three graduate students, work in our heat treatment facility. We also have 16 blue-collar employees, all of whom are Industrial Vocational High School graduates."

### **Owner of the first accredited laboratory**

Canbakan has said that they provide service with the principle of quality and customer satisfaction 24 hours a day, 7 days a week with a heat treatment facility operating in a closed area of 1500 square meters, and continued his speech by saying, "Due to the fullness of our 20 tons of production capacity per day, we cannot provide service to external customers as a subcontractor". In addition to these investments, we continue to listen to Canbakan, who specifically states that they have strengthened the existing laboratory by purchasing new machines in order to carry out the quality control of the produced bolts, which is another condition of being an integrated factory: "TURKAK has been applied to become an accredited

laboratory in accordance with ISO EN 17025. Since 01.06.2013, the first accredited laboratory among bolt factories in Turkey has been operating within the body of Berdan Bolts&Nuts. In our laboratory department, there are microvickers hardness tester, rockwell hardness tester, chemical analyzer, 60-ton pulling device and notch device. In this way, we are able to perform all tests of all our products in accordance with EN ISO 898-1 and American Bolt standards. In our laboratory department, 3 Metallurgical and Materials Engineers and 3 laboratory technicians serve. In addition, our laboratory department provides services to our external customers to complete the accredited laboratory needs of our region." Berdan Bolts&Nuts also owns the largest pulling device of Turkey and Europe with a capacity of 500 tons. Tuncay Canbakan, Heat Treatment Process Leader of the successful company, said, "Two torque devices that can perform torque tests on Bolts up to M72 are among the investments that Berdan Bolts&Nuts has made in order to provide quality and reliable service to its customers."

**"Berdan Bolts&Nuts increased its heat treatment capacity by meeting the increased production capacity in line with the demands of its customers with a 500 kg/hour continuous type heat treatment furnace manufactured by Sistem Teknik."**



## ELECTRONIC TRANSFORMER FOR ELECTRICAL FURNACES: JUMO IPC 300

Every heating element (alloys) must be driven by a different controlling method. Some is driven by phase angle or burst firing controlling methods, some others like SiC or MoSi<sub>2</sub> elements are suitable to be driven by electronic transformers.



### 1. What types of heating elements are used in Industrial Furnaces?

Electrical resistance heating is the leading thermal processing method for industrial heat treatment applications due to its unparalleled levels of efficiency.

Metallic alloy and ceramic heating elements in electrical furnaces convert 100% of supplied electricity into heat. These components are typi-

cally categorized by their ability or inability to perform in the presence of oxygen. Protective environments may be required to isolate heating rods fabricated from metallic alloys such as tungsten (W), molybdenum (Mo), tantalum (Ta), and graphite (C). Ceramic heating elements such as silicon carbide (SiC) are not sensitive to oxidation and are suitable for operation at elevated temperatures in atmospheric conditions.

**The alloys generally used as heating elements are listed below.**

#### 1.1. Metallic Alloys

Nickel Alloys, NiCr (Nickel-chrome) Alloys, FeCrAl (Iron-chrome-aluminum) alloys, CuNi (Copper nickel) alloys, Molybdenum alloys and Tungsten alloys are commonly used in electrical furnaces as metallic heating elements.

## 1.2. Ceramics

Also Graphite and SiC (Silicon carbide) materials are used as heating elements.

### SiC (Silicon carbide)

Silicon carbide is a refractory ceramic compound of silicon metalloid and oxygen. SiC heating elements are relatively economic to manufacture when compared to MoSi<sub>2</sub>. They have an upper temperature operating range of approximately 1,625° C. SiC can be treated and form a protective SiO<sub>2</sub> skin that prevents further oxidation at very high temperatures in non-reducing atmospheres. Resistance of SiC heating elements

increase up to 4 times due to aging. For this reason, the load voltage must be increased to obtain the same power. At a certain period of time, it is necessary to change the transformer stages (taps) and finally to replace the heating element.

### 1.3. Ceramic-metals (Cermets) MoSi<sub>2</sub> (Molybdenum disilicide)

Molybdenum disilicide exhibits excellent resistance to oxidation, is widely used in reducing atmospheres, and is suitable for temperatures up to 1,850° C. MoSi<sub>2</sub> elements support high power densities and are less susceptible to thermal degradation when compared to SiC and

nickel alloys. Its surface decomposes forming a protective layer of silica glass when exposed to oxygen at elevated temperatures.

When it is cold MoSi<sub>2</sub> (Molybdenum Disilicide) heating elements have very low resistance values, so it is necessary to use phase angle control and current limiting, and also a transformer which is supply voltage much lower than the mains voltage must be used.

As indicated in the table below, a larger phase angle is used to obtain a lower voltage, and much higher unused and unwanted reactive power is generated.

| Phase Angle | Load voltage | Active power | Apparent power | Reactive power | Ratio between Reactive power to active power |
|-------------|--------------|--------------|----------------|----------------|--|
| °           | V            | W            | VA             | VAR            |  |
| 170         | 7            | 10           | 860            | 860            | 86,0   |
| 160         | 19           | 190          | 2600           | 2590           | 13,6   |
| 150         | 36           | 700          | 5000           | 4900           | 7,0  |
| 140         | 56           | 1900         | 7800           | 7600           | 4,0  |
| 130         | 76           | 3600         | 10800          | 10100          | 2,8  |
| 120         | 98           | 6000         | 13800          | 12400          | 2,1  |
| 110         | 120          | 8900         | 16700          | 14100          | 1,6  |
| 100         | 139          | 11900        | 19200          | 15100          | 1,3  |
| 90          | 159          | 15300        | 21600          | 15300          | 1,0  |
| 80          | 174          | 18200        | 23400          | 14800          | 0,8  |
| 70          | 189          | 20900        | 24900          | 13500          | 0,6  |
| 60          | 201          | 23600        | 26300          | 11700          | 0,5  |
| 50          | 210          | 25400        | 27100          | 9600           | 0,4  |
| 40          | 216          | 26800        | 27700          | 7300           | 0,3  |
| 30          | 220          | 27700        | 28100          | 5000           | 0,2  |
| 20          | 222,5        | 28300        | 28400          | 2600           | 0,1  |
| 10          | 223,5        | 28300        | 28300          | 1000           | 0,0  |
| 3           | 223,7        | 28300        | 28300          | 200            | 0,0  |

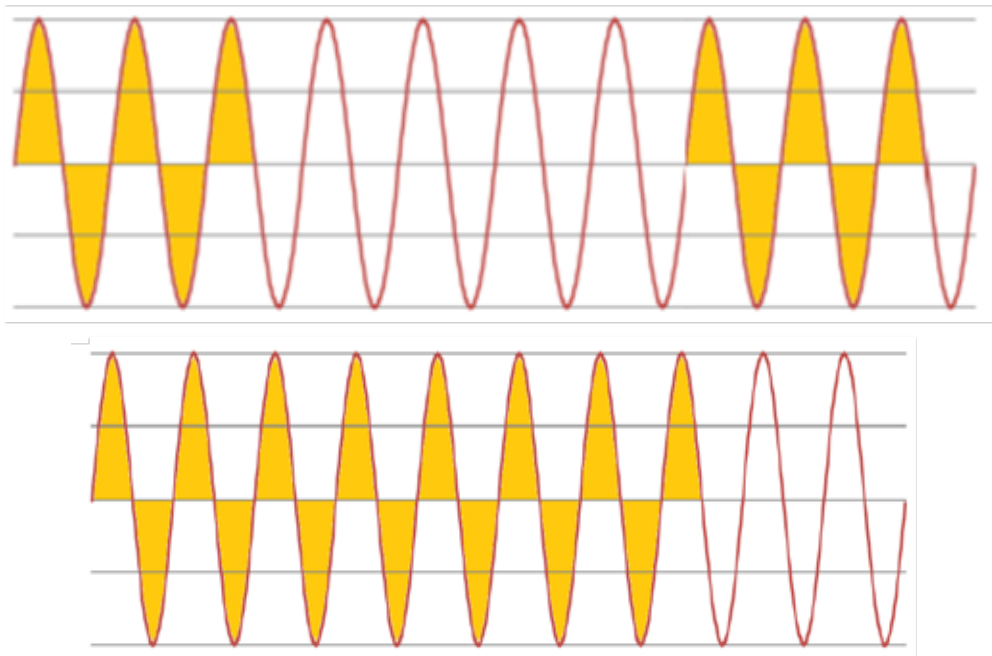


## 2. How are heaters controlled?

Temperature control in electrical furnaces is obtained by changing the form of the voltage applied to the heating element.

This type of discontinuous main current method is generally used with metallic heating elements which prevents harmonics and reactive power. It is fully given or cut off due to requirement of the nominal load (e.g. 40%). As a disadvantage, a situation called flicker occurs in the supply of connected (neighbor) devices.

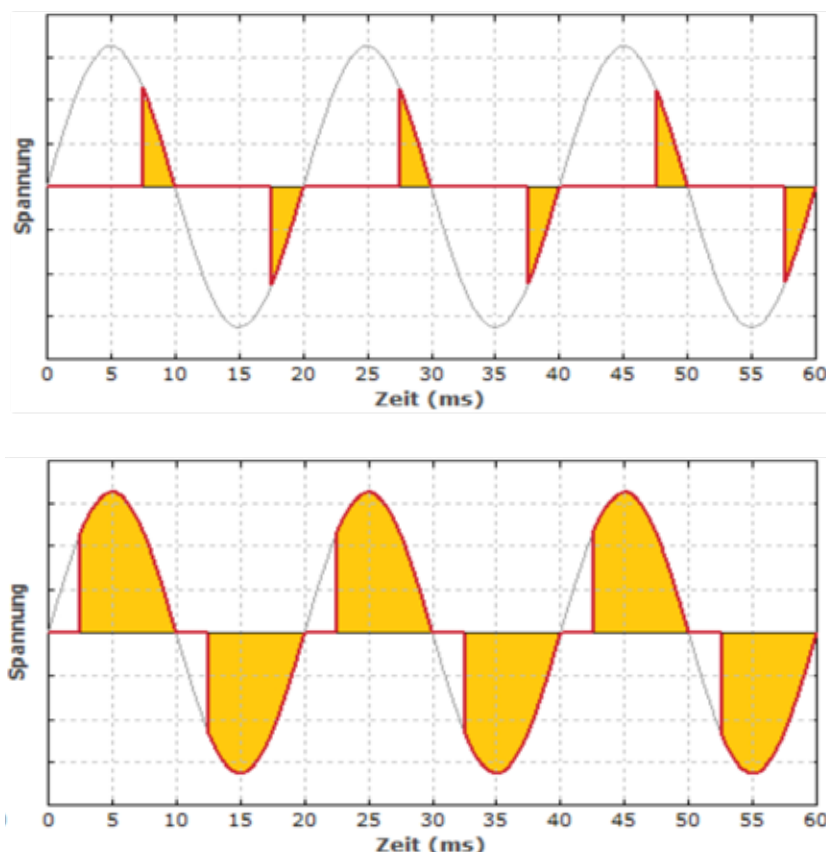
### 2.1. Burst Firing



### 2.2. Phase Angle

This type of discontinuous main current method is used with ceramic heating elements that current is controlled by delaying the output voltage up to a certain phase angle. To

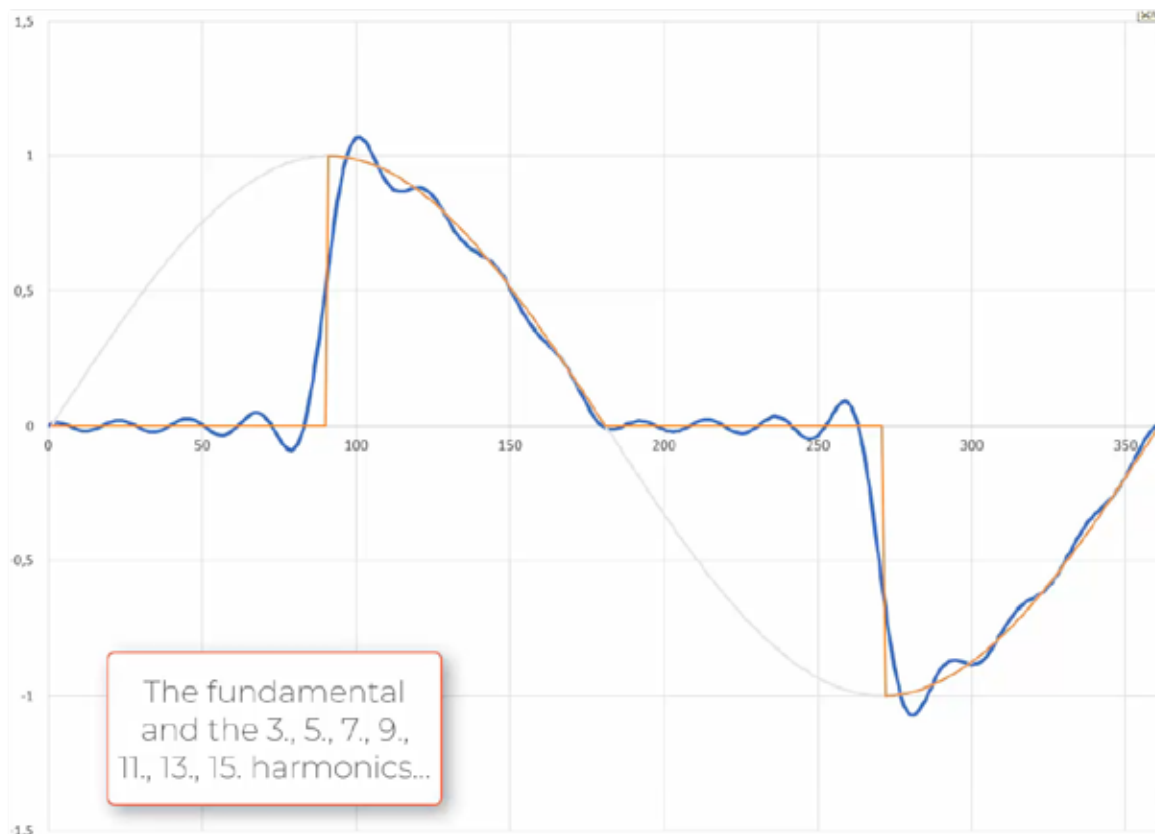
obtain certain phase angle, high frequency must be used, and this cause harmonics in the system. Furthermore, as there will be a phase difference between current and voltage, unused but consumed reactive power will occur.



### 2.2.1. What is the effect of harmonics in phase angle control?

Harmonics cause: current fluctuations in the range of 50% to 200% of the rated current, overload of the neutral conductor with up to 3 times the rated current, malfunction and failure of equipment, lower system availability,

influencing measuring systems, effects heat treatment and results deformed product or faulty parts, higher cost procurement of energy, due to consumed reactive power, oversizing of the plant, Increased investment costs, more current supplied with bigger devices.



▲ This graph shows how many harmonics occur (blue) in order to get 45% phase angle (orange) from the mains (grey).

### 2.2.2. What is the effect of reactive power?

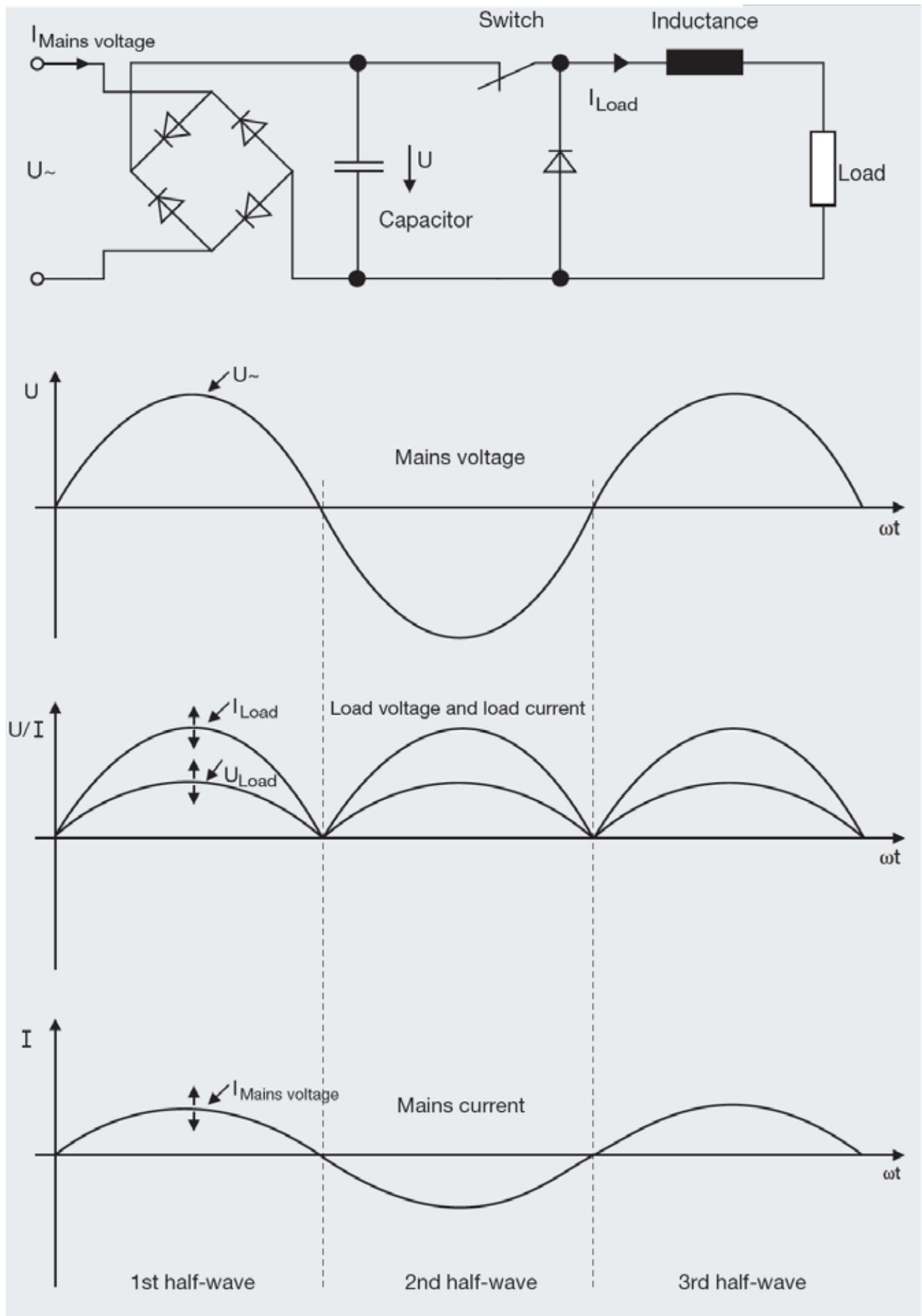
Active power = Current (Flow through resistance) x 230VAC

Apparent power = Total Current x 230VAC

Reactive power = Apparent power – Active power

The higher phase shift between current and voltage results the greater reactive power. As the reactive power increases, the cost of electricity consumption to provide active power will also increase. In order to meet the reac-

tive power during system setup, investments should be made for parts such as the supply line and transformer. Larger devices are needed for requirement of high current and voltage, so investments should be planned in bigger spaces. In addition, there will be additional costs for the compensation equipment to compensate reactive power. In fact, the company has to make huge investment expenses for this energy that it is not used effectively but spent.





## JUMO solution

### IPC 300 control

- The JUMO IPC 300 is an electronic transformer with amplitude control in the performance range up to 40 kW
- It works without creating a current peak with low level harmonics and reactive power in ceramic heaters.
- Since there is no phase shift between current and voltage in amplitude control, reactive power is minimized, and prevents harmonics.
- In IPC300 main current is continuous, for higher load requirement, more current is drawn without causing current peak.
- Due to the continuous control heating elements are operated smoothly. The heating elements are used for a longer period of time in this process, thus providing an advantage on service time.
- Not every heating element works at main load, as the temperature value of some heating elements changes, the resistance values change at a high rate. Therefore, the output load must be controlled with a transformer to balance the power. This causes additional expenses. The IPC300 does not need a transformer. For this reason, time and labor are saved as there is no need for rewiring to provide required load. The furnace continues to work without shut down.
- SiC heating elements are generally driven by transformers. The resistance of this element changes with high rate by aging. In this case, in order to provide a constant power output, the supply voltage must be continuously increased over the transformer by using multi-taps. Forgetting this process or doing it incorrectly causes rapid deterioration on SiC elements. In the IPC300, this situation is prevented by continuous load monitoring and power increase is automatically provided by amplitude control.
- In SiC heaters, there is an increase in the resistance value due to temperature and aging, and the power will decrease if driven with a constant voltage. Constant power flow is ensured by the P control (Power Control) feature of the IPC300. (P - Control)
- With the built-in current transformer in the IPC300, abnormal conditions such as open circuit, overcurrent are quickly detected. (Fault current monitoring)
- When the resistance difference in the heaters reaches far above the capacity, it gives a signal and indicates that the element is aged and needs to be changed. (Signaling aged element)
- MoSi2 heaters may short circuit and draw high current in cold conditions. The IPC300 solves this problem with its current limiting feature. (Current limitation)
- The resistance of the MoSi2 heating element is directly proportional to the temperature. When the resistance value is controlled and the threshold value is reached, the output power is cut off. In this way, the element is protected against overloads and extends maintenance and service life. (R -Control)
- It eliminates the need for compensation panel by minimizing harmonics and reactive power. It reduces operating and installation costs.
- Eliminates the use of multi-tapped transformers for variable voltage needs.
- Heating elements are operated smoothly with continuous amplitude control and prolongs their life.
- It prevents current peaks by using balanced load voltage.
- Reduction in electric consumption costs (low reactive power).
- Faulty productions are minimized due to less harmonics in the furnace system.
- All parameters, configurations and data can be monitored by built-in display.
- IPC300 configuration can be done by using the built-in keypad and screen, also it can be done via computer software by USB connection. Since the product is powered by USB, it does not need supply voltage during configuration.

# Clean Combustion for High Efficient Furnace Heating

Sistem Teknik Heat Engineering, provides thermal solutions for many aluminium, ceramics, glass and metal applications with Honeywell Maxon Burners.

For each type of furnace and kiln, we offer you the best suitable high temperature burner with the highest achievable performance. Whether you would like to build a new furnace, upgrade or retrofit an existing one, Sistem Teknik Heat Engineering will design for you the best technical and economical solution.



## Key features:

- High temperature uniformity in your heating chamber
- Low operating costs and process parameter flexibility
- Flexibility of your system and fast heat-up
- Low emissions
- Low maintenance and high reliability

### High temperature uniformity in your heating chamber

Stirring energy from Maxon high velocity burners can optimize temperature uniformity, while creating a fuel saving of up to 40 %, depending on heating cycle.

Sistem Teknik Heat Engineering, will assist you to determine a correct position of the burner in your furnace.

### Low operating costs and process parameter flexibility

The renowned Maxon MICRO-RATIO® or its electronic partner Maxon SMARTLINK™ EMRV are the ideal combinations to obtain the highest efficiency. Together with preheated combustion air and/or flue gas recirculation, this can be even improved.

### Flexibility of your system and fast heat-up

The broad turndown range of Maxon burners allows you to process your equipment for different or combined cycles without losing efficiency and/or product quality. It also reduces the heat-up time significantly.

The dual fuel feature of many burner types offers you extra flexibility.

### Low emissions

Sistem Teknik Heat Engineering is continuously developing new combustion principles ready for future environmental laws.

Maxon burners combines an innovative advanced mixing technology with an extensive internal flue gas recirculation. As a result of this, we are able to guarantee the lowest NO<sub>x</sub> levels, even on high furnace temperatures.

### Low maintenance and high reliability

Sistem Teknik Heat Engineering always focussed on industrial equipment, meaning rigid, simple design, resulting in low maintenance and high reliability

## Features of Kinemax burner



|                                     |   |      |
|-------------------------------------|---|------|
| <b>Capacity:</b>                    | Max 2460 kW   |      |
| <b>Throttling Rate: (max)</b>       | Gas   | 48:1 |
|                                     | Liquid Fuel   | 10:1 |
| <b>Fuel Type:</b>                   | Natural gas, propane or liquid fuel<br>(Models 2&6 can be used with liquid fuel)                                |      |
| <b>Other Features:</b>              | Max output speed 85 m/s<br>Preheated combustion up to 425 C<br>air can be used.<br>It can be used up to 1650 C. |      |
| <b>Favorite Application Fields:</b> | Heat treatment furnaces<br>Incinerators-Incinerator<br>Melting Furnaces<br>Glass Furnaces                       |      |

## Micro Ratio Valves Properties



Flow control valve

Air, gas and oil ratio control

Adjustable, wide throttling range

With the help of the multi-screw reed assembly, all the burner capacity range, separately to air/fuel valves mechanical position adjustment.

The connecting rods between the Air/Gas/Oil valves provide a single point control of the fuel requirements of multiple fuel or multi-zone systems.

## OUR SERVICES

- Specially designed complete combustion systems
- Innovative heating technologies
- Projects based on environmental protection
- Process control and safety
- After Sales Services and 24/7 service support



**Honeywell**  
MAXON

**ST** **SİSTEM TEKNİK**  
engineering services



## SCHNEIDER ELECTRIC'S ADVISOR APPS, ANALYTICS AND SERVICES GIVE INDUSTRY, BUILDING, DATA CENTER AND ENERGY MANAGERS UNPARALLELED EFFICIENCY

- With EcoStruxure Machine Advisor, OEMs can remotely monitor, monitor and fix their machines
- Operators can anticipate and implement preventive maintenance requirements and increase machine availability

Following rapid digitalization in manufacturing, machine manufacturers (OEMs) need to provide better services to increase customer flexibility and ability to meet market needs. Schneider Electric, a leader in the digital transformation of energy management and automation, today introduced its EcoStruxure Machine Advisor platform, which enables OEMs to remotely Monitor, Monitor and Repair machines, providing great benefits for operators.

### Real-time operational awareness is a competitive advantage

Digitization in manufacturing has great potential as connectivity, mobility, cloud computing and big data analytics are rapidly adopted. According to a study by McKinsey in 2015, digitization will reduce time-to-market by 20%-25%, optimize expertise by 45%-55%, and reduce machine downtime by 50% by 2025.

In this highly competitive environment, OEMs need solutions that will increase the connectivity of their machines, provide real-time operational awareness and machine access to increase operational efficiency, as well as develop new business opportunities in services. While ensuring safety and data security, operators should also be able to benefit from these advantages.

### Get maximum data value with EcoStruxure Machine Advisor

Leveraging its great expertise in the OEM segment, Schneider Electric EcoStruxure™ Machine Advisor turns data into essential informa-



tion for machine builders, providing new levels of productivity and growth. "With EcoStruxure Machine Advisor, OEMs gain real-time access to their machines, enabling them to add and replace services at any installed site anywhere in the world," said Ali Haj-Fraj, Senior Vice President, Machine Solutions, Schneider Electric. EcoStruxure Machine Advisor provides a fully connected framework for reliable machine operation through the following key functions:

- **Tracking:** OEMs can visualize the locations of all their machines with real-time access to documents and

history such as bills of materials, manuals, maintenance records and task management programs.

- **Monitoring:** With cloud-based software, OEMs can collect and visualize machine data in real time, accessing a comprehensive analysis of Overall Equipment Efficiency (OEE), performance charts by key KPIs and other trends, and dashboards to monitor machine availability and output quality.

- **Repair:** A mobile application service that simplifies maintenance and operation with the help of context sensitive information, step-by-step procedures and augmented reality expertise.

# SCHNEIDER ELECTRIC'S MODICON M262 CONTROLLER AND TESYS ISLAND DIGITAL LOAD MANAGEMENT SYSTEM ENABLE FULL IIOT MACHINE INTEGRATION WITH UNPRECEDENTED EFFICIENCY

- The breakthrough TeSys island and the ultra-connectivity of the Modicon M262 enable IIoT integration of new machines and retrofits that are easier, faster, and cheaper
- The offers deliver a fully digital ecosystem, magnifying benefits of new technologies through EcoStruxure for Machine Builders, unlocking new business opportunities for OEMs in an increasingly competitive environment

**H**annover (Germany), April 1, 2019 – Amid rapid adoption of IIoT, Machine Builders must provide and manage connected machines that improve end-user efficiency. Schneider Electric, the leader in digital transformation of energy management and automation, announces the innovative Modicon M262 Logic & Motion controller and TeSys island multifunctional digital load management system, which give OEMs unprecedented ease in deploying IIoT-ready machines. Today's ultra-competitive business and technology landscape requires machine builders to redefine the way they operate. This landscape is made more challenging by a growing shortage of IT-qualified talent, mass customization and individualization of products. In this context, OEMs must engage in long-term strategies now, by adopting IIoT connectivity, mobility, cloud computing, and big data analytics, to deliver smarter, more efficient, and cost-effective machines that enable new services and revenue streams.

## TeSys island Digital Load Management and Modicon M262 Logic & Motion Controller give OEMs complete digitization through EcoStruxure

EcoStruxure, Schneider Electric's open, IoT-enabled architecture and platform, helps OEMs deliver greater operational efficiency throughout the machine life cycle. EcoStruxure, combined with TeSys island Digital Load Management and Modicon M262, gives OEMs unprecedented ability to rapidly integrate IIoT into new and existing machines:

- TeSys island, a new fully-digitized IoT connected load management solution that saves on design, wiring, and commissioning time as it is based on multifunctional devices and avatars for

industrial applications with loads up to 80 amps.

- Modicon M262 with embedded direct cloud connectivity and encrypted communication protocols, and up to 5 separated Ethernet networks for fast logic and motion performance in demanding applications. Modicon M262 provides benchmark performance with 30% better motion and four times faster CPU execution than the market preference.

## IIoT-ready offers allow faster, more scalable and secure machine integration at scale

EcoStruxure allows for up to 40% faster integration of Modicon M262 and TeSys island, into any environment: machine to machine, machine to plant, and direct machine to cloud, using open standards, with built-in end-to-end cybersecurity that offers encrypted communication and network segmentation. TeSys island and Modicon M262 eliminate the need for additional hardware of a traditional contractor solution for cloud connectivity, with testing and commissioning capabilities to facilitate upgrades of existing equipment at scale.

## Digitization enables optimized design and reduced time to market

Modicon M262 and TeSys island, with EcoStruxure Machine Expert configuration and commissioning software and the EcoStruxure Motor Configurator tool, help OEMs accelerate time to market, as they enable multiple teams to simultaneously program and control the quality of design. Modicon M262 allows quick plug & work embedded system access for easy network configuration and replacing devices with zero installation. This reduces commissioning and service tasks by roughly 50%. Enabling more efficient integration, TeSys island's innovative object-ori-

entated concept of TeSys avatars acts like a digital twin on top of the physical objects. TeSys island eliminates the need for auxiliary wiring and reduces the need for I/O modules, making it 40% faster to integrate and reducing installation costs by 30% compared with traditional solutions.

## Connected machines guarantee performance and unlock new business models

Remote visibility into machine performance enables OEMs to offer new global services supported by the embedded cloud connectivity. EcoStruxure Machine Advisor gives engineering and maintenance teams access to information, on any machine and at any time. This enables opportunities to provide new service offers, such as preventive maintenance, that add real value for end-users. TeSys island provides reliable preventive maintenance data and pre-alarms which avoid machine stoppages when unusual electrical load behaviors are detected. This reduces time for corrective actions by up to 50% through smart maintenance and services.

*"Machine builders and OEMs have traditionally looked for solutions which could lower their cost and improve the machine performance. This is still true, but now they also need to digitize to stay competitive," said Peter Herweck, EVP, Schneider Electric Industry. "With EcoStruxure Machine Expert, Modicon M262 Logic & Motion controller, and TeSys island digital load management system, OEMs have a future-proof solution that brings digitization to reduce configuration time, reduces wiring and I/Os, and increases processing speed. This solution will enable OEMs to quickly see the advantages of the Industrial Internet of Things."*





EcoStruxure™ Secure Connect Advisor allows operators to remotely access, program and monitor machines.

EcoStruxure™ Secure Connect Advisor provides secure remote access to the Harmony HMI family and connected devices, helping you save time and travel costs.



[se.com/tr](http://se.com/tr)





### Effective and easy use

- Ecostruxure Secure Connect Advisor is ready to use with the latest series of Harmony HMIs and iPCs
- Provide remote access to program, control and monitor
- Speed up machine-related operations and reduce downtime

### Works for anyone, anywhere

- It can be used in every sector, in all applications
- Access can be provided from computer, tablet and mobile phone

### Reliable and safe

- End-to-end cybersecurity for OEMs, System Integrators and end users alike
- Provide secure access to remote devices over the Internet

### Easy to subscribe

- Buy only one annual subscription
- Choose the "remote service package" tailored to your needs and connect to a remote machine at short notice

This software-based solution does not require any extra hardware and works with your existing Harmony ST6 panels

### Harmony ST6

- High-resolution and cost-effective HMI family with 16 million colors
- Harmony ST6 and STM6, Basic and Modular HMI, provide an intuitive user experience using the latest software and visualization innovations from EcoStruxure Operator Terminal Expert.
- Harmony STW6 is a complementary ready-to-use version that can be used with Web HMI, HTML5 Browser.



Detaylı teknik bilgi ve sipariş için Müşteri Destek Merkezi'miz ile iletişime geçebilirsiniz: 444 30 30 - tr-hotline@se.com

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Life Is On

**Schneider**  
Electric

# HKTM BLAZES THE TRAIL THE INDUSTRY IN MOTION CONTROL



 Figure 1 - 2.2MN Aluminum Extrusion Press Hydraulic System

**W**e are a company established in 1998 with the aim to see what we can do with the inspiring technologies of the changing world, and to ensure the magnificent integration of engineering and art, industry and nature, factory and environment, technology and life, machine and system, process and result, human and dream, work and love. Since the very first project we undertook, we have taken each and every of our steps by listening to our customers and surveying their habits and needs and we still do the same. From the first day, we have been

moving forward together with Bosch Rexroth, one of the leading technology companies of the world, and trying to make our sub-brand HKSM (Motion Control Service Center) a leader in its segment. In order to meet this goal, we focus on 2 areas in our service and production processes:

- Hydromechanics Systems
- Mechanics Automation and Robotics

Our departments, which have been specialized in their own fields, meet all of your expectations thanks to their mutually complementary services with their Engineering and



 **Ziya SADIKOĞLU**  
HKTM Project Sales Manager



Turnkey projects.

In summary, we adopt the motto of trying to control the movement by being inspired by the nature of the movement. In parallel with this, with being specialized in different action and control technologies and engaged in generating multidisciplinary engineering solutions that are held up as an example, we keep on manufacturing in an attempt to become a global center for control technologies of industrial action.

The expertise of Bosch Rexroth is the determinant factor in all our activities within the framework of the main dealership that we have been conducting since our establishment. The products that we use in our product sales as well as in our projects carry the Bosch Rexroth label.

On the other hand, hydromechanical project designing is undertaken by HKTm project engineers in accordance with the conditions and system requested by our customers.

Even if we apply our engineering solutions with different disciplines in almost all sectors that need motion control, especially the iron and steel and aluminum sectors are among our priorities. In most of the systems designed in these sectors, it is very important that the products used are resistant to harsh conditions, high repeatability precision and short cycle times for the smooth running of the processes.

Considering that there are new facilities or modernization investments in many countries today, the efficiency of these facilities is another issue that is highly regarded by customers. Therefore, machine manufacturers or end users need reliable and experienced suppliers in these matters.

At this very point, we, as HKTm, are one of the leading companies in these sectors with our experi-



Figure 2 HKTm Custom Hydraulic Cylinders



Figure 3 - 2.2MN Aluminum Extrusion Press Main Direction Control Block



Figure 4 - 2.2MN Aluminum Extrusion Press - Hydraulic Tank



ence in all hydraulic motion control systems of the listed below for these two sectors from past to present;

- Aluminum Extrusion Line Furnaces
- Aluminum Melting Furnaces
- Aluminum Plate Annealing Furnaces
- Autoclave Furnaces
- Forging Line Furnaces

- Aluminum Billet Annealing Furnaces
- Aluminum Billet Homogenizing Furnaces
- Fire Test Furnaces
- Moving Floor Furnaces

and with our team of 120 experts in their fields, we provide all project and design support to our customers from the planning stage to turn-key solutions under a single roof and supply comfort.



**'This is why engineering is one of the most creative ways to make dreams come true.'**



### Plastic Injection Robot

RS series robots, together with the knowledge of HKTM, experience of 20 years and advanced technology, have been designed for plastic injection machines. Thanks to their proven software, KRS series robots minimize the impact duration of robots on the cycle duration by moving in synchronization with all the movements of your injection machine.

#### Advantages

Thanks to the dynamic servo motors, high precision linear movement components and engineering of Bosch Rexroth, KRS series robots are able to keep their pace and positions for each cycle at pick and place, insert placement, IML (in-cast tagging) and quality assurance applications. With their internationally accepted software base, they complete the machine as they can be integrated accurately and easily into all plastic injection machines and applications. Servo motors with absolute encoders are used in all of the axes and this allows for the robot to remember its position in case of a power outage, thus preventing waste of time. In the robotic axes where racks are used, the noise during the movement is kept optimal using helical racks. The proven rail trolley group used in the robots provide correct movements thanks to accurate movements and maximum rail trolley wear times. Thanks to the torque control present in all three axes (X Free), damage towards the robots' axes as it picks the products is prevented.



### Automatic Donkey

With Industry 4.0 and Digitalization, solutions that offer autonomous systems have replaced most of the traditional applications. An important part of this is the autonomous vehicle technologies used in industrial working areas. HKTM aims to use Autonomous and Semi-Autonomous solutions to meet this need in the industrial working environments. HKTM aims to ensure that these solutions it has developed are optimal solutions that fully meet the needs of the customer.



### Hydraulic Rotary Actuator

Hydraulic rotary actuators are actuators that provide high torque output by rotating the piston, which is moved linearly by means of hydraulic fluid, and the shaft to which it is connected by means of inner and outer involute gear system, between certain angles.

#### Hydraulic Rotary Actuator Use Cases

Hydraulics are used in marine and aviation sectors, Defense industry, Mining sector, work benches, lifting machines and energy generation areas in particular. For example: planes, tool benches, presses, injection machines, test devices, industrial type robots, automotive industry, lifting and transportation machines (forklifts, etc.), work machines (concrete pumps, greyders, mobile cranes, excavators, etc.), agriculture machines, dams, turbines, nuclear powerplants, loading and discharging units of ships, ship control systems are the areas where one can meet hydraulic systems the most.



# 800 years later; Elephant Water Clock

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Reputation and  
claim came  
together at HKTM.

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The "Elephant Water Clock" machine made by the Mesopotamian engineer al-Jazari, who founded robotics about 300 years before Leonardo Da Vinci, was reinterpreted for HKTM by the sculptor İskender Giray for HKTM 800 years later. This magnificent machine-sculpture, which will add movement to the imagination, and which will bring together engineering and art, reputation and assertion, has opened to visitors at HKTM's green factory in Gebze, which takes values such as Cezeri as an example and carries out "Good Engineering" projects in the industry.



İskender Giray



# ÇİMSATAŞ EXCEEDS ITS TARGETS

Çİmsataş, which is among the top 500 industrial establishments that shape the exports of our country, is advancing towards its targets with sure and solid steps by turning the negativities brought by the Covid-19 epidemic process into an opportunity. In this process, the successful company increased its profitability and productivity rates with the Isothermic Annealing Furnace signed by Sistem Teknik.

Çİmsataş, which serves as a sub-industry to the construction equipment, automotive, railway and agricultural machinery sectors by producing hot forging and steel casting parts as raw and processed, has exceeded its targets and increased its profitability rates despite all the negativities of the Covid-19 outbreak. One of the contributors to this increase is Sistem Teknik. Çİmsataş Heat Treatment Chief Mustafa Özalp has said and added that they have increased their profitability and productivity rates with the Isothermic Annealing Furnace signed by Sistem Teknik.



Mustafa ÖZALP  
Çİmsataş Heat Treatment Chief

## Welcome. First of all, we would like to get to know you. Who is Mustafa Ozalp?

Hello, first of all, I would like to thank you for allocating a place for me and the Çİmsataş Company I work for in your magazine. Through you, I would like to convey my respect and love to all company employees serving in the Heat Treatment sector. I am 51 years old and have been working at Çİmsataş for 18 years. My career, which I started as a quality engineer, continued by working in various production departments.

## Can we get some brief information about your company?

We can say that Çİmsataş is a fully integrated facility. We are a company that has succeeded in being among the top 500 industrial establishments that shape our country's exports. Çİmsataş laid the foundations to make construction machine parts in the 1970s.

It is one of the most valuable companies of our country, which has managed to produce products for the automotive and railway (High Speed Train) sector together with the construction equipment in the time taken. Within our factory, the Forging facility with an annual capacity of 24 thousand tons, a Foundry facility with an annual capacity of 12 thousand tons, the machining centers where we carry out the processing operations of the draft parts produced in these facilities, the Mechanical Machining facility consisting of CNC lathes and universal benches, the Heat Treatment facility with an annual capacity of 28 thousand tons and the painted parts of our customers. We have a Wet Paint facility established to respond to final product demands.

**The desire to get fast support brought together with Sistem Teknik.**

## So, how did your paths cross with Sistem Teknik? How did the idea of choosing the Gas Heated Roller Conveyor Isothermic Annealing Furnace come about?

My personal acquaintance with Sistem Teknik took place during my student years. I had the opportunity to meet with the founding partners of your company, Mehmet Özdeşlik and Orhan Obalı, at their Kozyatağı offices where they worked in the 1990s. On this occasion, I would like to express my condolences to the family and relatives of our esteemed industrialist Orhan Obalı, who passed away untimely. As a company, we met with the Sistem Teknik Temper furnace, which was commissioned in 1997. With the continuous increase in our business, we received support from companies that made contract heat treatment for a while in order to respond more easily to the demands of our customers. In 2008, we ordered the Sistem Teknik



Annealing – Temper and Isothermic Annealing furnace.

The most important factor in ordering this furnace to Sistem Teknik was the idea of supporting the domestic industry and getting quick support against furnace failures that we would experience. We could solve the problems or additional demands we have had since the installation of the furnace, especially with the solution-oriented approaches of Mehmet Özdeşlik, Gökhan Lale and the after-sales team. In our Heat Treatment line, we also have other furnaces with electric heating, roller conveyor and push. However, the increasing demands of the automotive industry, our desire to serve the automotive industry more, the increasing quality expectations of our customers and the obligation to increase our competitiveness by lowering the heat treatment costs led to the thought that we should order a new heat treatment furnace.

**Isothermal Annealing Furnace is widely used in the production sector today. What do you think has changed with the Gas Heated Roller Conveyor Isothermal Annealing Furnace?**

While ordering our furnace, we always tried to prioritize being able to

carry out different operations in the same furnace, meeting customer expectations comfortably, fulfilling the requirements of quality management systems, low operating costs, efficient use of furnace capacity, and short response time to breakdowns and downtimes. With the commissioning of our Gas Heated Roller Conveyor Isothermic Annealing and Annealing-Temper Furnace, we have started to meet all the requirements I mentioned above. Of course, since the beginning, it has become necessary to make some improvements in our furnace as a result of both the diversity of customer demands and the continuous improvement works. We have carried out these works together with our own team and the Sistem Teknik after-sales team since the establishment of our furnace, and we will continue to do so as needed.

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

As it is known, the Heat Treatment Process is a special process. Therefore, it is extremely important to determine and record the Heat Treatment parameters and to trace the pro-

cess records. The positive results we have achieved in our Sistem Teknik furnace and the high efficiency rate we have achieved.

**Finally, can you talk about your goals for the next year in the hope of leaving behind the effects of the difficult process we are going through due to Covid-19?**

Çimsataş is a corporate company managed with targets. Even during the Covid-19 epidemic, we worked hard to achieve our company goals, and I think we managed this process in the best possible way as a company. In addition to the additional demands of our existing customers, we are really happy that our new customers are joining our company portfolio. We plan to activate new investments, which are on our agenda, in a planned manner. We are considering to respond to the demands of our forging and casting facilities by adding a multi-purpose Heat Treatment furnace to our production line. As a company, what we do to our production line in the coming period

In addition to continuing investments, we also want to focus on our Industry 4.0 digitalization and accurate information exchange efforts in order to manage our business processes with data-based scientific methods.





## AN EXEMPLARY PROJECT BY SARVION AND ASIL ÇELİK

Asil Çelik's experienced team and Sarvion worked together and achieved a great project. Sarvion contributed to the production planning by completing the project before the planned time.

**A**sil Çelik is a worldwide Turkish brand, which produces alloyed, non-alloyed and high-alloyed, hot-rolled and heat-treated qualified steel in different sizes and shapes needed for the machinery manufacturing industry and the energy sector, as well as the automotive industry. With experience of more than 40 years and its expert staff, Asil Çelik is the largest qualified steel producer in our country and provides approximately 60% of Turkey's production in qualified steel. The giant company has signed an exemplary project with the successful company Sarvion, which plays a leading and complementary role in the maintenance and retrofit of industrial furnaces and heat treatments.

### "Asil Çelik is a Turkish brand that we are proud of"

We wanted to learn about this project in detail and to hear firsthand what the achievements were. Project Man-

ager Batuhan Açıkalın answered our questions sincerely, "Asil Steel makes us all proud as a world-wide Turkish brand. As Sarvion, we are very happy to complete this project together with the experienced team of Asil Çelik and to have contributed to the production planning by completing it before the planned time with our professional project management approach. As Sarvion, we have carried out many successful revision projects in the iron and steel industry. We are aware of the impact of any delay in the plan on production. With this awareness and many years of sectoral experience, we have carried out a successful revision in harmony with the Asil Çelik team."

### Energy efficiency achieved with cooperation

Within the scope of the project, Sarvion modernized 1 hardening and 1 tempering furnace in the OFU heat treatment line located in the Asil Çelik factory. The insulation,



**Batuhan AÇIKALIN**  
Sarvion Project Manager

mechanical parts and combustion systems of the heat treatment line, which have been in operation for many years, were renovated, and maintenance was facilitated by installing an automatic grease system. In addition, the design and control of the furnace doors were



redesigned and modernized according to current technologies. Açıkalın explained the purpose of the project as follows: "The main purpose of the project is to ensure energy efficiency, ease of maintenance and prolonging the life of the furnace. In addition, it is aimed to increase the metallurgical quality of the products by increasing the performance and efficiency of the furnace."

### Great success in a short time

Although the duration of the project was determined as 40 working days by Asil Çelik in the contract, upon the request of the Asil Çelik management, Sarvion team carried out a study on planning and shortened this period. Project manager Baturhan Açıkalın said about this success: "The line that we have revised is a very critical line for the company. Since it is a line where even a one-day production loss is of great importance, it was delivered ready for production in 28 working days by performing an intense working plan with the professional team".

### Gains and benefits of the project

We continue to listen to the gains and benefits of the revision from Açıkalın: "The scope of the project is the complete renewal of the refractories of the furnaces, as well as the critically renewal of the furnace doors, the maintenance of the burners and the addition of the automatic lubricating system. As a result of



"With the awareness of the importance of the sector and the effect of any delay in the plan on production, the Sarvion team carried out a successful revision with the Asil Çelik team and completed an exemplary project."

the renewal of the furnace refractory, which has been deformed over the years, its efficiency has been increased. Furnace with a more homogeneous heat distribution has emerged. With the renewal of the entrance and exit doors of the furnaces, efficiency in time and labor is achieved. And renovation provided ease of intervention, especially in case of malfunctions and maintenance. At the same time, heat leaks between the furnace doors and the

body are eliminated. The maintenance of the combustion system ensured that all burners were activated efficiently and furnace homogeneity. In addition, with new lubricating system approximately 324 lubrication points had been added with automatic control system. The bearing lubrication process was being implemented manually before the revision, after revision it became safer, it also saved from labor and extended its service life."





# ARSAŞ INCREASED ITS PRODUCTION CAPACITY WITH THE ESS LINE

Arsaş, one of the group companies of Yanmaz Holding, which closely follows innovative developments and the latest technology, has increased its production capacity with the investment of the ESS Line it made.



**O**perating as a group company of Yanmaz Investment Holding, Arsaş is one of the licensors of the GEOMET process, one of the Zinc laminated coating applications. In addition to its existing processes, Dip-Spin and Dip-Drain applications, the successful company, which made the investment for the Electrostatic Spray (ESS) Line worth 1,000,000 Euros last year, activated this investment in May 2021 and started to serve its customers. According to the statement made on the subject, the ESS Line with a monthly capacity of 500 tons has also succeeded in increasing Arsaş's monthly production capac-

ity to the level of 1,500 tons. Thus, it had the opportunity to open up to new markets.

## The most valuable form of application

ESS applications are expressed as the most valuable application of the Zinc Lamellar coating process compared to other applications (Dip-Spin-Dip Drain). In ESS applications, the parts are hung on hangers and delivered to the customers in the same form after the process is completed as they come from the customer. Authorities have continued their explanations as follows: "Laminated chemical is atomized in

spray guns rotating at 60,000 cycles and a homogeneous uniform layer is formed on the surface of the part, and it successfully passes both visual and all physical tests. In the ESS application line, other applications can be made as a top coating, together with Zinc lamination applications. It has a very effective power especially in the coating of parts with high diameter, length and weight. It reveals the quality of all fasteners from M8 to M80, from 100 mm to 1300 mm in length, as well as the connection equipment in the machinery industry, power transmission lines and wind energy panels with its flawless applications."



**45** tons of production  
per year

**135** TL turnover  
per year

12,000 m<sup>2</sup> plant completed in Istanbul in 2020, 16,000 m<sup>2</sup> plant continuing in  
Istanbul and 18,000 m<sup>2</sup> plant have already started in Izmir.

**investments in a total plant area of 46,000 m<sup>2</sup>**

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## MICROWAVE FURNACES OF SISTEM TEKNIK OFFER AN ADVANTAGE BY REDUCING THE COSTS OF THE HEAT TREATMENT OF THE PALLET

With the microwave oven we designed as the Sistem Teknik R&D team in accordance with the regulations, the heat treatment for the pallets takes place within 7 minutes. Thus, operating costs are minimized.



**W**ith the microwave furnace we designed as the Sistem Teknik R&D team in accordance with the regulations, the heat treatment for the pallets takes place within 7 minutes. Thus, operating costs are minimized.

The Ministry of Agriculture and Forestry OF Turkey published the directive that will enter into force as of 01.01.2020 with the title of "Regulation on Heat Treatment and Marking of Wood Packaging Materials" in the Official Gazette dated 25.05.2019 and numbered 30784. According to the directive, it is stated that wood materials with a thickness between 6 mm and 200 mm can be heat

treated in accordance with the ISPM 15 standard in microwave furnaces which are operating according to the dielectric heating method and under the frequency of 2450 MHz.

### **Multifunctional and Profitable**

In addition, it is emphasized that the wood material should be heated to obtain a temperature of 60°C for at least one minute, including the surface temperature, in order to put the ISPM 15 stamp on the wood material to be heat treated with a microwave furnace.

It is stated that the temperature measurements to be taken from different points in the furnace should be

recorded with precision. As Sistem Teknik R&D center, we can carry out the heat treatment of the pallets within 7 minutes with the microwave oven we have designed according to the regulations. Compared to conventional heating technologies, our microwave furnace takes up much less space in a much shorter time, minimizing operating costs, and has the function of adapting to pallet fastening lines. In this direction, we will continue to bring industrial microwave furnace to our industry with tests and different designs for different applications and to continue our R&D activities.





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## SISTEM TEKNİK AND SARVION IN MOSCOW

The wind of Turkey blew at the Metalloobrabotka Exhibition in Moscow. Sistem Teknik and Sarvion, which took part in the exhibition, agreed on new collaborations with Russian partners.

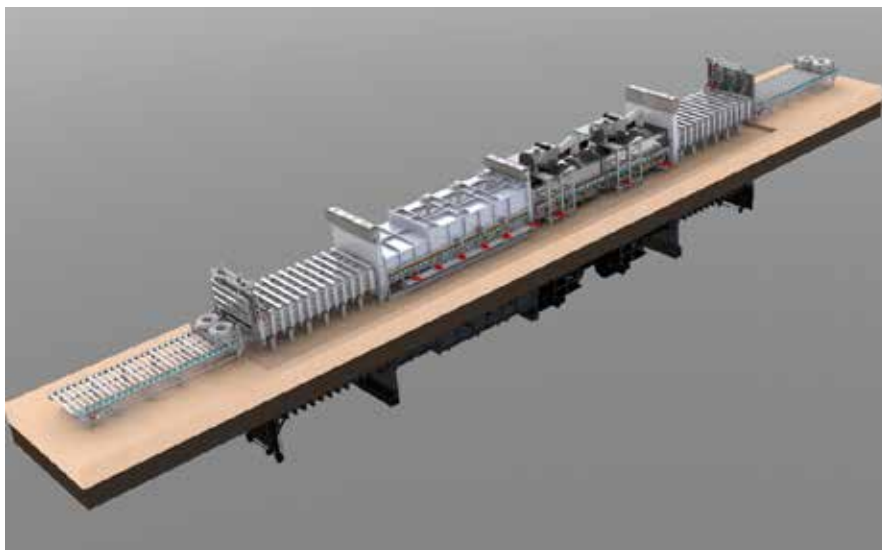


**M**etalloobrabotka Exhibition which is accepted one of biggest sectoral exhibition of Russia was held in between 24-28 May in Moscow Expocenter with a great interest. Welcoming thousands of visitors from more

than 50 countries every year the exhibition is the first large-scale exhibition in Russia after the pandemic. Meetings were held with both existing and potential customers for 4 days, and new collaborations were agreed.

## FIRST STEP FOR THE NEW PRODUCTION FACILITY

Sistem Teknik continues to support Turkish companies' investments. An agreement has been reached for the production of a copper tube annealing plant with a roller conveyor heat treatment line with a capacity 12,000 tons/year.



**T**urkey's leading company who is in the copper pipe industry and Sistem Teknik have reached an agreement for the production of a copper tube annealing plant with an annual capacity of 12,000 tons. The heat treatment facility will consist of inlet and outlet loading/unloading zones, vacuum chambers, atmosphere-controlled annealing furnace and atmosphere-controlled cooling zones. The total length of the line will be 55 meters. The production and installation of the heat treatment plant at the customer site is planned to be completed in 2022.





With the possibilities of 2,5 MW electric power, 4 MW gas connection, cooling water facility and liquid nitrogen for protective atmosphere, all the produced furnaces can be tested with full capacity in our factory.

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- Bright Annealing Furnaces
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- Bell and Pit Type Furnaces
- Protective Atmosphere Pipe Annealing Furnaces
- Continuous Treatment and Isothermal Annealing Plants for Forgings
- Endogas and Exogas Generators





# SISTEM TEKNİK CROWNED ITS SUCCESS WITH THE INDUSTRIAL COMPANY OF THE YEAR AWARD!

As Sistem Teknik, we have added a new one to our achievements by receiving the 2020 industrial company award. Mehmet Özdeşlik, our Chairman of Board, who has received the award on behalf of our company at the night organized by the Kocaeli Newspaper, has said in his speech, "In 2020, despite the pandemic conditions, we increased our export rate to 73 percent."

**K**ocaeli Newspaper traditionally rewards the successful names of the business world every year. The 2020 results of the evaluation, which was named as Doruktakiler, were announced at a ceremony held in the past few days. A limited number of guests attended the award ceremony held at the Burhan Kasım Assembly Hall of the Kocaeli Chamber of Commerce due to the Pandemic. The guests were hosted at the cocktail before the award ceremony. After the cocktail, awards were presented to the people and institutions previously determined by the grand jury in 16 categories with the votes of 128 people.

## The biggest responsibility project this city has ever seen: Doruktakiler

Speaking at the opening of the program hosted by Berkan Arslan, Kocaeli Newspaper General Manager Erkan Ünal said, "Since the year 91, Doruktakiler which we have realized is one of the biggest social responsibility projects this city has ever seen. With this award ceremony, we certificate and



note the situation of our compatriots who deserve their positions. We want successful people and institutions to feel more belonging to this city."

## And the best of the year: Sistem Teknik

Sistem Teknik became the "Industrial Company of the Year" in the organization where the bests of 2020 were selected and companies that

set an example with their success were awarded. Mehmet Özdeşlik, our Chairman of the Board who received the award on behalf of our company, explained his pride and happiness with the following words: "In our company, which we are proud of by being among the giants of the world, we increased our export rate to 73 percent in 2020, despite the pandemic conditions."



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Kartal Bombe, the company that always breaks new ground, is in the position of the strongest supplier of the global market with the quality certificates it uses while carrying out its production. It strengthens Turkey and itself in the world market with both the products and services it offers.

250m<sup>3</sup> LPG tanks, which were shipped to Albania, one of Kartal Bombe's latest projects, set off safely. Each of the tanks is designed with a weight of approximately 40 tons and a design pressure of 17.12 bar. The LPG tanks, which stand out with their physical properties, have a diameter of 3500 mm and a length of 27,000 mm, including the camber. Tanks with accessories such as Rochester level gauge, manometer and safety valves are not only produced according to international standards, but also according to the inner tolerances of Kartal Bombe, which have tighter tolerances.

Kartal Bombe is proud of successfully shipping 10 LPG tanks produced in Turkey to meet Albania's gas storage needs.





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- Tank Accessory ■ Pressure Equipment...



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DOUBLE  
WALL  
VACUUM  
TANK

## KARTAL BOMBE INDUSTRY

**KBS**, which is at the forefront of the world with its products, manufactures single and double walled pressure equipment, especially vacuum tanks, for Turkish industrial furnace manufacturers according to customer demands. **Kartal Bombe Industry**; It can take part in stamped projects with ASME U, ASME U2 and ASME S quality certificates, as well as design and produce according to EN 13445, AD 2000 Merkblatter and other international standards.

**EAGLE**, which was established with the principle of high quality service and product production, has started to serve in the expansion tanks sector under the roof of **KARTAL GROUP** as a new brand structured with an innovative perspective.



## KARTAL BOMBE ve BASINÇLI KAPLAR SANAYİ ve TİCARET A.Ş.

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# YOUR SOLUTION PARTNER **BAYKAL REZISTANS** IN INDUSTRIAL **HEATING** PROJECTS

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 philosophy. On the other hand; the company Baykal is also official 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 Sri 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.



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

Leak Testing for Underground Storage Storage  
of Hazardous Materials





**L**eaks 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.

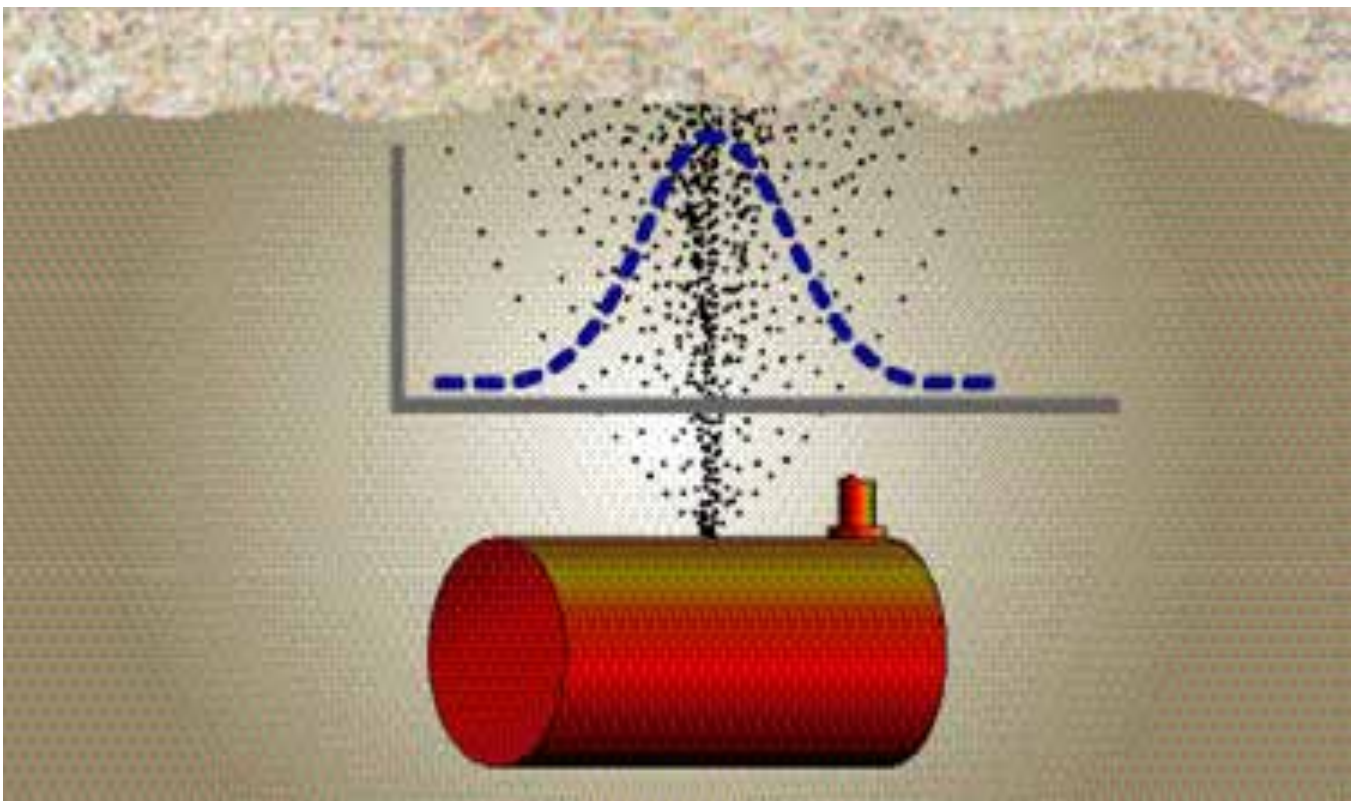
1- Leak Detection At Initial Installation

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.

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# Oil and Gas Industry Leak Test for

## Precise, powerful, easy-to-use

### HLD Helium Leak Detector

- High sensitivity
- Application-specific configurations
- It can detect even a few cc leaks per year.



## Portable Sniff Detector

### PHD-4 Portable Helium Det.

- Easy to carry simple
- Versatile and absolutely reliable.
- It can detect even a few cc leaks per month.



## Solution for vacuum or pressure distribution Pipes containing steam and chemicals

### Harsh Environment (HE) Probe for Leak Detectors

- Allows testing on hot and wet surfaces.
- It is not clogged and only allows the passage of helium.
- It absolutely protects the vacuum system and the spectrometer.



## Solution for underground pipes and storage tanks

### PHD-4 PRO Leak Detector

- Up to 4 hours of battery life.
- Portable, easy to use and operator friendly.



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# Industrial Furnace Solutions

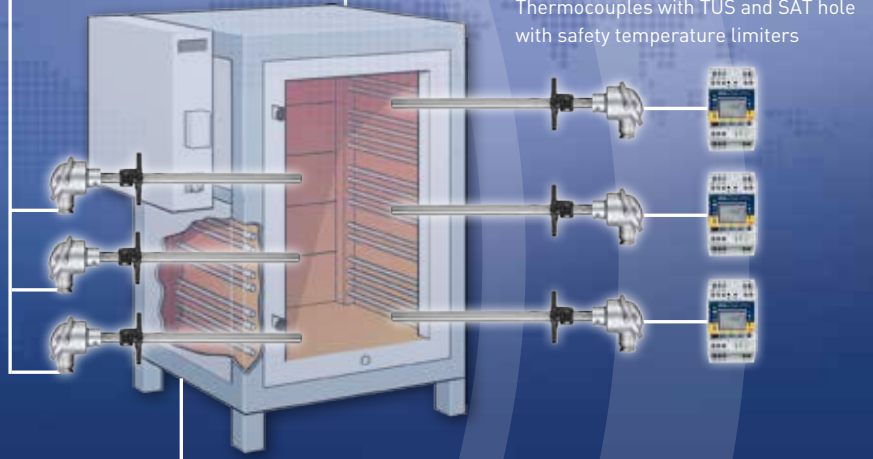
Recording and control  
JUMO LOGOSCREEN nt and JUMO mTRON T



Thyristor power controller



Portable measuring system for AMS2750  
and CQI-9: JUMO thermoCOR  
implementation of SAT and TUS tests



Thermocouples with TUS and SAT hole  
with safety temperature limiters

More than **sensors + automation**

**Temperature measuring:** L, J, K, S, B and N types of thermocouples are produced up to SIL3 with DAkkS approval in which materials 1.4789, 1.4841, HASTELLOY®, Kanthal®, Alloy 20, Inconel 600, zirconium dioxide C610 and C799.

**Control and recording:** JUMO PID control algorithm has proven itself to achieve great control in industrial furnaces. Parameters (also datas) are saved while performing accurate control with mTRON T. It is also possible to record the datas with Logoscreen 600 /nt or fd multi-channel recorders. These devices are produced by calibration certificates according to the **AMS2750** or **CQI-9** standards.

**Thyristor power controller:** SSR or thyristor power control units are used to control resistive and resistive-inductive loads heated by electrical power. JUMO **TYA-201** has single-phase power control, **TYA-202** has 3-phase economy circuit, and **TYA-203** has 3-phase power control.

**Monitoring:** Process parameters that may exceed the limit values are monitored with temperature limiters/monitors or safety temperature limiters/monitors, and any potential hazards are prevented by intervening in the system. Safety levels; PL according to **DIN EN ISO 13849-1** and up to **SIL2, SIL3** according to **DIN EN 61508** can be achieved with **JUMO Safety M STB/STW** devices.

**SAT and TUS Tests:** Independent SAT and TUS tests can be performed regularly with the **JUMO thermoCOR** portable measurement and calibration system. ThermoCOR has been calibrated with DAkkS approval in our accredited laboratory according to **AMS2750** and **CQI-9** standards.

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