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WE ARE AT THE BEGINNING OF THE ROAD, AND IT IS A LONG ROAD



Our dear readers,

We are pleased to present you with the 8th issue of our magazine, which we brought to you for the first time two years ago. After two years with the effects of the pandemic, all industries have entered the process of change and transformation. In this process of change and transformation, it is necessary to give importance to cultural change in the first place. It takes a great deal of effort and time to change human behavior and work techniques.

We also try to give our managers all the support they need to guide their teams in the right direction. We have taken important steps towards lean production, lean factory and digitalization in our group companies. We are at the beginning of the road and we will continue to progress on this long road.

We continue to provide quality and price advantages to our customers by controlling our costs even more in difficult conditions such as the pandemic, uncertainty, global supply problems and the ongoing Russia-Ukraine war. We see the projects, we are going to do with world giant companies such as BGH and SKF, as the fruit of our efforts. As a company, we focus on energy efficiency at a time when issues such as the Green Deal and border carbon tax come into our lives. The studies carried out by our R&D center in this direction have started to provide tangible benefits to our company.

The way to reduce the energy carried by the conveyor belt to the outside in mesh belt furnaces is to reduce the belt weight, we have achieved energy efficiency by reducing the belt weight by 1/4 with the methods we have developed. The tension system we developed for this method, which is very useful for light loads, has been registered as a patent; Thank you to all my friends who contributed.

In addition to these developments, the Russian and Ukrainian markets, which are very important for us, were interrupted by the war. Apart from the economic effects, I wish that this war, which has caused great suffering to the Ukrainian people and affected the whole world, will end immediately.

I wish you success in your work, healthy days and pleasant reading.

Mehmet Özdeşlik

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ENERGY EFFICIENCY AND GREEN CONSENSUS

Ozan YILMAZ, Mechanical Design Manager

In 2019, greenhouse gas concentrations reached a new peak, with carbon dioxide reaching 148%, methane 260% and nitrous oxide 123% of pre-industrial revolution levels:

It is human activities and their consequence, climate change, that are driving record levels of greenhouse gases in the atmosphere (WMO, 2021).

The day on which humans consume the natural resources that the planet produces in a year, or in the language of economics, the day when demand exceeds supply, is referred to as World Overshoot Day. For 2021, the World Overshoot Day has been set as July 29. This means people (WWF, 2021):

- They have used up in seven months what the world had given for a year,
- In other words, they pretended there was 1.7 Earths,
- For the remaining five months of the year, they had to exhaust the resources of 2022,
- They have increased the rate of consumption to the highest level since the 1970s, when the 'Overshoot' was first calculated.

In the face of such rapid consumption of resources in the world, some measures have been considered. The circular economy model has come to the agenda as a green economy

model that uses energy and natural resources efficiently, recovers waste, does not harm the environment and contributes to sustainable development. Thus, the widely used production/consumption structure based on the linear economy model covering the processes of production, use and disposal of products (take - make - throw) has been replaced by a sustainable and innovation-based circular economy system in which waste is recycled and reused, resource efficiency is ensured and raw material costs are reduced (Republic of Turkey Ministry of Trade, 2021). The principles of circular economy are listed below:

- Rethink
- Reduce
- Re use
- Repair
- Refurbish
- Remanufacture
- Repurpose for Another Purpose
- Recycle

The circular economy is an economic model that is gaining importance in the European Union (EU), China, the United Kingdom and the United States. One of the main reasons for its emergence in our country is the strategies and targets set within the framework of the "European Green Deal".

The "European Green Deal" put forward by the European Commission on December 11, 2019 for sustainable development and transition to a green economy in the European Union aims to achieve a zero greenhouse gas emissions transformation (climate / carbon neutral - climate neutral) by 2050 for the member states of the European Union. However, the ECC also aims to ensure that other countries trading with EU countries reduce their greenhouse gas emissions. The fact that Turkey is one of the countries with high trade partnerships with EU countries makes it necessary to give importance to the issue of greenhouse gas emissions. Turkey, which conducts nearly half of its trade with EU countries, needs to closely follow the steps to be taken by the EU while shaping its strategies and policies on energy management. This is important for maintaining relations with the EU on the one hand and maintaining international competitiveness on the other. In this framework, the Ministry of Trade prepared a "Green Deal Action Plan" in 2021. According to TurkStat "Greenhouse Gas Emission Statistics, 1990-2020" data, when we examine the total greenhouse gas emission values in 1990-2020, we see that it has been in an increasing trend until the last period.

(million tons CO2 eşd.)

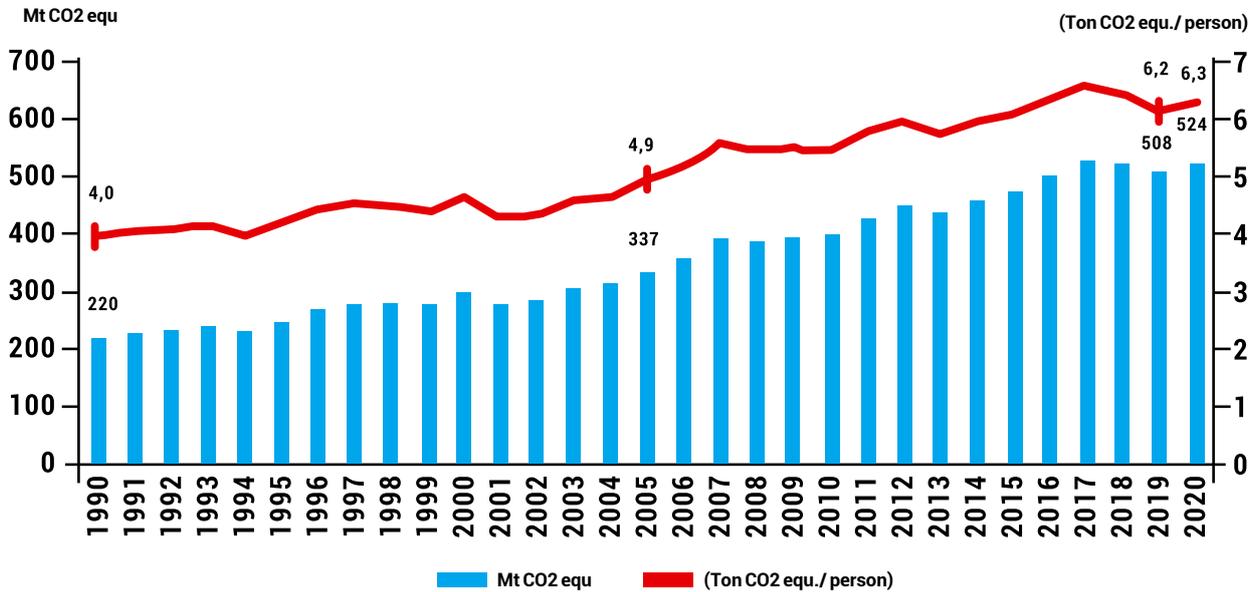
	1990	2000	2010	2015	2016	2017	2018	2019	2020	1990-2020 change (%)	2019-2020 change (%)
Total Emission	219,7	299,0	398,7	474,5	500,8	528,3	524,0	508,1	523,9	138,4	3,1
Energy	139,6	216,0	287,8	342,0	361,7	382,4	374,1	365,4	367,6	163,3	0,6
Industrial processes and product utilization	23,0	26,3	49,0	59,2	63,5	66,4	68,0	58,6	66,8	1905	14,0
Agriculture	46,1	42,3	44,4	56,1	58,9	63,3	65,3	68,0	73,2	58,8	7,5
Waste	11,1	14,3	17,4	17,1	16,7	16,3	16,6	16,1	16,4	48,0	2,1

Figures in the table may not be equal to total because of rounding off.

▲ Table 1: Greenhouse gas emissions by sector, 1990-2020

According to the results of the greenhouse gas inventory, greenhouse gas emissions in 2020 increased by 3.1% compared to the previous year and were calculated as 523.9 million tons (Mt) CO₂ equivalent. Total greenhouse gas emissions per capita were 4 tons CO₂ equivalent in 1990, 6.2 tons CO₂ equivalent in 2019 and 6.3 tons CO₂ equivalent in 2020.

Total and per capita greengouse gas emissions, 1990-2020



In the process of transition to a green economy as envisaged in the European Green Deal, the Ministry of Industry and Technology has started to take steps for the transition to a circular economy by making regulations in the field of industry within the framework of environmentally sensitive and green economy with the 2023 Industry and Technology Strategy. Turkey's Green Deal Action Plan lists the actions planned to be realized under 9 headings including 32 targets and 81 actions. These headings (Republic of Turkey Ministry of Trade, 2021):

- Carbon regulations at the border,
- A green and circular economy
- Green financing,
- Clean, affordable and secure energy supply,
- Sustainable agriculture
- Sustainable smart transportation,
- Tackling climate change,
- Diplomacy,
- European Green Deal information and awareness raising activities

OBJECTIVE	ACTION
Carbon on the Edge Regulations	
Conducting studies to limit the impacts of the EU's carbon regulation at the border	Identification of a roadmap or activities to support GHG emission reduction in priority manufacturing industry sectors that may be subject to border carbon regulation
	Modeling the impacts of the Carbon Regulatory Mechanism at the Border on energy-intensive and resource-intensive sectors on the basis of scenarios, working on a sector basis and evaluating the actions to be taken
	Improving the system for monitoring greenhouse gas emissions from industry according to the needs
	Carrying out studies for certification activities within the framework of methodology/standards to be determined by the EU, providing technical support for reporting
Continuation of assessment studies for a national carbon pricing mechanism	Determining Turkey's position on carbon pricing, taking into account the EU's Border Carbon Regulation, within the scope of Turkey's transition to an appropriate carbon pricing mechanism
	Conducting studies on the additional costs that the implementation of the national carbon pricing mechanism will create on the sectors and its effects on the economy, and in this context, evaluating support mechanisms for increased costs, such as the EU ETS State Aid Guidelines

Green and Circular a Economy	
Developing green transformation of industry and circular economy in Turkey	Identifying priority sectors within the framework of circular economy and conducting detailed impact and needs analysis studies for these sectors
	Preparation of a National Circular Economy Action Plan
	Completion of technical and administrative studies for the implementation of the Green Organized Industrial Zone and Green Industrial Zone Certification System
	Implementing harmonization studies within the scope of the EU Circular Economy Action Plan by disseminating the Turkish Environmental Labeling System, exploring opportunities for cooperation with the EU
	Updating clean production legislation in the textile sector where water consumption is high
	Establishment of clean production legislation for the leather sector where water consumption is high
	Organizing training programs on clean production practices in textile and leather sector
	Informing companies, especially SMEs, on environmental labeling and waste management
	Utilization of international financing sources and IPA funds as much as possible in activities/ projects that will contribute to the transition of industry to a green and circular economy and emission reduction
	Development of a National Life Cycle Assessment (LCA) Database
Strengthening technological infrastructure for green transformation	Identifying the prominent technologies that will support compliance with the ECC and green production through technology needs analysis and conducting studies for the development/ dissemination/transfer of the identified technologies
Integrated pollution prevention and control activities within the scope of sustainable consumption and production	Preparation of the national action plan and implementation schedule for the implementation of the EU Integrated Pollution Prevention and Control (IPPC) legislation
	Preparation of general and sectoral national legislation, including EU Integrated Pollution Prevention and Control (IPPC) legislation and Best Available Techniques Outcome Documents
	Preparation of the National Sustainable Consumption and Production Action Plan
Improving the sustainable use of water in production and consumption and the reuse of wastewater	Developing and expanding the use of treated wastewater
	Sectoral water footprint calculation on basin basis in the context of conducting studies for Turkey's 'Water Footprint' assessment
	Research on the use of remote sensing, sensors and informatics applications in the management of water resources, their benefits and open areas for development
Efforts to comply with the Sustainable Product Initiative	Harmonization of the new legal framework to be established under the EU Sustainable Product Initiative
	Following the explanation of the Sustainable Product Initiative, the EU legal framework and sectoral strategies in this context, information activities on sectoral basis
Harmonization with EU chemicals legislation	Following the changes in the EU chemicals legislation and completing the harmonization studies with the EU legislation
Reducing endocrine disrupting chemicals	Monitoring endocrine disrupting chemicals in drinking water sources
Resource efficiency studies at regional level	26 Development Agencies established at 26 levels and in 2 regions carry out resource efficiency studies to ensure transition to green and circular economy in the regions

Green Financing	
Determining the steps that can be taken regarding the national financing system in line with the financing need for green transformation	Reviewing the national incentive system and identifying the needs, taking into account the incentives provided in the EU to promote green transformation
	Assessing the development of a National Energy Efficiency Financing Mechanism
Developing an ecosystem that will enable the development of green finance in Turkey	Preparation of a legislation aiming to determine the sustainability of investments by taking into account the taxonomy legislation of the EU and international organizations
	Completion of the preparations for the Sustainable Bond Framework Document within the scope of a possible green or sustainable bond issuance to be realized by the Ministry of Treasury and Finance in international capital markets
	Preparation of Green Bond Guide and Green Sukuk Guide
	Conducting studies on Green Sukuk
	Determining a roadmap for the development of sustainable banking
Ensuring effective utilization of existing financing opportunities	Initiatives to improve Turkey's access to international finance for its green transformation
	Taking initiatives before the EU and member states to access EU financing opportunities for candidate countries on green transformation
	Compiling information on all international/EU and national support/financing opportunities related to environment and climate change
	Carrying out information, promotion and incentive activities in order to maximize the benefit from available financing opportunities in line with the objectives of the European Green Deal
Clean, Economic and Secure Energy Supply	
Reviewing renewable energy and energy efficiency policies in the framework of the European Green Deal	Assessment of development areas by analyzing the gap in renewable energy and energy efficiency studies within the scope of the European Green Deal
	Consciousness-raising and awareness-raising trainings on energy efficiency for the authorities of industrial facilities, especially enterprises operating in Organized Industrial Zones
	Preparation of national strategy documents, guidelines and roadmap for the dissemination of energy efficient and low carbon heating and cooling systems
	Conducting awareness-raising activities on Green Tariff and YEK-G Certificate
	Carrying out activities to provide 1000 MW of WPP, SPP every year until the end of 2027 in line with the National Energy and Mining Policy
Sustainable Agriculture	
Reducing the use of pesticides and anti-microbials	Carrying out activities to reduce the use of pesticides and anti-microbials in Turkey in line with the targets set by the EU for the reduction of pesticides and anti-microbials
	Expanding the use of biological and biotechnical control methods within the framework of efforts to reduce pesticides
Development of organic agriculture	Development of organic agriculture production
	Completion of the harmonization of the EU's organic agriculture legislation and, in parallel, initiatives before the Commission for mutual recognition in the field of organic agriculture with the EU

Sustainable Agriculture	
Reducing the use of chemical fertilizers	Carrying out studies in line with the EU's targets and policy changes to reduce the use of chemical fertilizers
Land consolidation activities	Conducting consolidation registration activities
Increasing the use of renewable energy in agriculture	Utilization of existing geothermal resources in Agriculture Based (geothermal greenhouse) Specialized Organized Industrial Zones started in Aydın, Denizli, İzmir and Ağrı provinces
	Supporting greenhouses and production facilities using renewable energy
Improving waste and residue management in agricultural production	Completion of R&D studies on the reuse of wastes and residues in agricultural production
Reducing food loss and waste	Raising awareness and consumer consciousness for the recycling of food residues and wastes
Raising awareness on the EU Farm to Fork Strategy and Biodiversity Strategies	Organizing information activities on the farm to fork and biodiversity strategies announced by the European Commission
Sustainable Smart Transportation	
Development of Sustainable and Smart Transportation	Enacting a Combined Transport Regulation to support the balanced development of transportation modes and methods
Development of Green Maritime and Green Port practices	Preparation of national legislation on the Green Port Certificate Program and holding information and promotional meetings to ensure maximum benefit from this program and to raise awareness
	Preparatory work for the declaration of the Mediterranean as a SECA (Sulphur Emission Control Area)
	Reducing harmful emissions from the maritime sector and promoting green shipping
Development of rail transportation	Improving and developing the railway infrastructure between the EU and Turkey
Reduction of fuel consumption and emissions	Carrying out strategy development and planning activities for the development of electric vehicle and charging infrastructure
Expanding the use of micro-mobility tools	Completion of the necessary legislative work to increase the use of micro-mobility tools such as bicycles and shared electric scooter systems in order to reduce exhaust emissions and provide alternative fuel, low emission individual transportation opportunities, preparation of Bicycle Transportation Master Plans and construction of bicycle / scooter roads, parking and charging stations
	Use of IPA funds in urban transportation projects, especially bicycle lanes in the context of sustainable urban mobility
Combating Climate Change	
Tackling climate change	Preparation of the Report on Combating Climate Change
	Preparation of 2023-2030 Climate Change Action Plan and 2050 Climate Change Strategy
	A multidimensional assessment of Turkey's position on the Paris Agreement, taking into account Turkey's international financing needs

Assessment of the impacts of climate change on terrestrial and marine areas and specific water resources through ecosystem-based approaches and practices	Investigating the impacts of climate change on biodiversity and ecosystems, including desertification and land degradation
	Investigating the impact of climate change on coasts, lakes and wetlands and determining adaptation measures
	Strengthening the Land Disturbance Compensation (ATD) approach at the national level
	Ensuring the integration of the ATD approach into land management planning and practices and mainstreaming it at the country level
	Mainstreaming sustainable agricultural techniques that take into account adaptation to climate change
	Determining the amount of carbon sequestered and monitoring changes in carbon stocks through sustainable land management and best practices on desertification and land degradation
	Ensuring the use of methods that include nature-based solutions (windbreaks, direct sowing on stubble, green strips, etc.) in practices to combat desertification and land degradation
Diplomacy	
Exploring opportunities for cooperation	Exploring cooperation opportunities with EU member states
Initiatives to protect Turkey's rights and interests arising from international agreements	Continuing initiatives to protect the rights arising from the Customs Union, DTO and other international agreements in the EU Border Carbon Regulations and other legislative harmonization efforts
European Green Deal Information and Awareness Raising Activities	
Carrying out information and awareness-raising activities related to the European Green Deal	Conducting an assessment of the European Green Deal for Turkey and carrying out awareness-raising activities with the coordination of the public and private sectors in the harmonization process

 Table 2: Turkey's Roadmap for the European Green Deal (Ministry of Trade, 2021)

In order for the European Green Deal to succeed and achieve its goals, a very serious commitment is also essential. Because, despite the fact that the world needs to reduce greenhouse gas emissions by at least 45% by 2030 to avoid the catastrophic consequences of global warming, only 11% of the world's top 250 corporate emitters are planning major cuts by 2030 (Murugaboopathy and Jessop, 2021). With the Border Carbon Regulation, the EU is trying to minimize the damage to its competitiveness by protecting companies that will bear the cost disadvantage to protect the climate. In light of these developments, it is clear that Turkey, which makes almost half of its exports to the EU, will be directly affected by the EU's 'green transformation'.

It is predicted that the carbon regulation at the border, which is called a tax-like practice (DW, 2021), will cost the Turkish economy 0.07% of GDP, increasing costs especially in the cement sector, but the main problem will be access to finance unless Turkish companies produce permanent policies against the climate crisis (Mihm, 2021). In order to make Turkey's transition to 'green production' sustainable without economic losses, Turkey needs to plan and support the sectoral impacts of the Green Deal and the smooth transition to compliance with the deal. In this framework, under the leadership of the Ministry of Trade and with the coordination of all public and private sectors, an Action Plan with thirty-two objectives and eighty-one actions under nine main criteria was announced;

this plan, which is a roadmap, aims to improve export competitiveness, maintain and strengthen Turkey's competitiveness in the international arena, both increase green investments in Turkey and become a center of attraction for green investments and support green transformation (Sustainability Consultancy, 2021). In line with this goal, although the carbon regulation at the border imposes an annual burden of 1.1-1.8 billion euros on Turkish exporters in their trade with the EU (Aşıcı M. A., 2021: 13), Turkey should see this burden as a transformation opportunity for the inevitable transition to the new 'carbon neutral' economy or 'circular economy'. K. ECER, O. GÜNER, M. ÇETİN European Green Deal and Harmonization Policies of the Turkish Economy

ENERGY EFFICIENCY IN INDUSTRIAL FURNACES

Alper KELEŞOĞLU, Technology Development and Innovation Manager
Esra BAYIR, Technology Development and Innovation Engineer

Industrial furnaces in the iron-steel industry are mainly used to meet heat treatment needs such as annealing or hardening, tempering, soft annealing, normal annealing, stress relief annealing, carburizing, nitriding, and drying for hot forming. According to the intended use, industrial furnaces varies according to their types, size and capacities from each other. For this reason, parameters such as heating time of the materials to be heated to the heat treatment temperature, material geometric structure and chemical composition, charge weight, protective atmosphere requirement and economic working conditions are taken into account while determining the furnace type. [1].

Academic studies and findings showed that the importance of efficient use of energy phenomena is increasing day by day. Energy efficiency, which is an indicator of the effective use of energy, not only

forms the basis for the quantitative examination of the devices used, but also indirectly affects phenomena such as air pollution and greenhouse gases. In the proceedings published by the international energy agency, it is estimated that in 2030 CO₂ emissions from energy production will increase by 49% compared to 2005 [2]. In this context, energy efficiency also helps to keep emissions under control as a result of its positive contributions to the energy production.

The international climate change panel states that to achieve 50% of the probability of global warming below 2°C compared to pre-industrial times, worldwide greenhouse gas emissions must be significantly reduced. If this can be achieved, it is believed that climate changes caused by 2°C warming can be addressed with acceptable social and economic costs [3]. For this reason, all energy consuming sectors should be evaluated in

order to identify energy efficiency measures that can help to achieve the proposed targets by reducing energy demand and CO₂ emissions. A convenient way to do this is to evaluate processes in the relevant sectors and identify the possibilities to reduce energy demand for these processes.

The iron and steel industry is one of the largest energy consuming industry with an annual energy consumption of approximately 24 EJ globally. This consumption value corresponds to approximately 5% of the world's registered energy consumption [4]. Approximately 30% of the fuels used in the industrial sector are consumed by furnaces. In addition, 10% of the industrial electricity needs are used in furnaces. Academic studies on industrial furnaces and furnaces have concluded that the potential for efficiency improvement is between 10% and 40%, depending on the sector and application [5]. There are many steps to

Sector	Energy Consumption Improvement Potential
High-Capacity Steel Reheating Furnaces	Up to %10
Glass Melting and Processing Furnaces	Between %10...%20
High-Capacity Ceramic Furnaces	Between %10...%20
Metal Melting, Foundries, Scrap Conversion Furnaces	Between %20...%40
Medium Sized Furnaces (Fossil Fuel)	Up to %10
Medium Sized Furnaces (Electric)	Between %20...%40

▲ Table 1. Energy Consumption Improvement Potential of Sectoral Based Industrial Furnaces [4].

be taken towards increasing efficiency which has great potential worldwide and thus sustainability and green consensus in the sector. One of these steps, the concept of digital twin has started to be studied in industrial furnaces [6]. In Table 1, predictions regarding the development potentials of industrial furnaces are given.

In order to examine the energy efficiency in furnaces, the

general energy balance can be expressed with the following headings.

Incoming Energy:

• **Fuel/Electric Energy:**

Generally, industrial furnaces can be examined under two different energy sources according to the operating method, as shown in Figure 1.

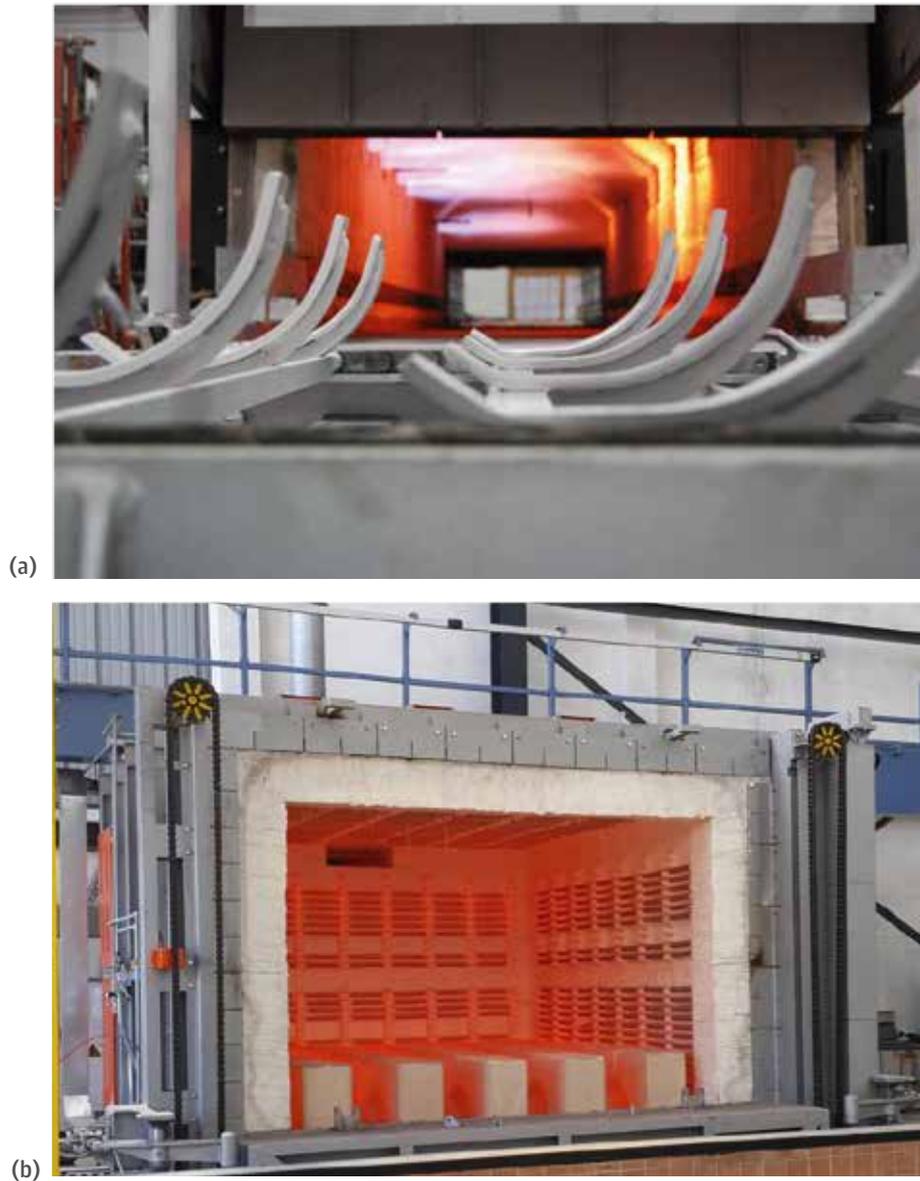


Figure 1. (a) Fossil Fueled Industrial Furnaces, (b) Electrical Industrial Furnaces

The availability of natural gas and propane are very common, and thus most industrial furnaces are operated with such gaseous fluids among fossil fuels. Furnaces that operated with fuel-oil and diesel-fired also exist. The main advantages of using gas or liquid fuels among fossil fuels are listed as:

- It offers the opportunity to be transported easily by means of pressurized lines,
- Ability to work at lower air-fuel ratios since it has a high probability of mixing homogeneously with air,
- More than one burner can be used in order to ensure temperature homogeneity inside the furnace,

- Creation of a controlled flame structure depending on the furnace requirements,
- High combustion efficiency,
- Ashless combustion.

The following situations are encountered when the burners are operated with the wrong air-fuel ratio.

- If excessive air-fuel ratio is provided to the burner, the combustion efficiency decreases, since most of the energy will be spent on heating the air supplied in excess,
- The chemical composition and concentrations of the flue gases

change, therefore there is a danger of exceeding the emission limits determined by the regulations,

- The heating capacity of the furnace decreases and the desired heating ramp in the furnaces becomes difficult to achieve,
- The temperature distribution in the furnace is adversely affected and the temperature homogeneity in the furnace useful volume may be disrupted. However, it should not be forgotten that the efficiency of electrical furnaces is generally higher than that of fossil fueled furnaces and the use of

fossil fuels in our country provides an advantage to the operator in terms of operating costs. Considering the initial investment and maintenance costs, electrical furnaces appear to be advantageous.

Output Energy:

- **Energy Transferred to the Material,** The amount of energy transferred to the material is considered as the actual useful heat transfer expected from the industrial furnace.



- **Heating Temperature of Insulation,** The heating temperature of the insulation is defined as the amount of energy that the materials used in the furnace insulation material have accumulated until they reach stable working conditions. The main parameters considered in the selection of refractory materials in industrial furnaces are listed below [7].
- Fire resistance at atmospheric con-

- ditions and under pressure,
- Low heating temperature or heat capacity,
- Heat transfer coefficient that changes with temperature,
- Resistance to chemical effects and slag,
- Resistance to sudden temperature changes,
- Resistance to deformation at high temperatures,

- Mechanical strength,
- Resistance to abrasion,
- Gas permeability.

Loss from Openings

Opening loss describes the heat loss by convection and radiation from the inlet and outlet sections of the continuous furnaces

• **Energy Loss from the Chimney**

Chimney loss is formed by the release of the energy contained in the flue gases which have the potential to have a high energy content, to the environment without being recovered. The waste heat or the energy

contained in the flue gases can be utilized by using recuperators or economizers. In this context, the qualifications to be considered in terms of appropriate equipment design and the factors that affect them are listed as:

- As small heating surface as possible: Cost
- As low wall temperature as possible: Life
- As low-pressure loss as possible: Cost and Life



• **Heat Loss from Furnace Surface to Environment**

It describes the heat loss from the hot zones in the furnace body to the environment. Generally, the case

where the furnace body temperature is maximum 40°C higher than the ambient temperature is acceptable.

• **Leakage Heat Loss from Cracks and**

Gaps in the Furnace

Leakage heat loss is from cracks and gaps in the furnaces. Such losses can be caused by surveillance gaps, as can be seen in the figure below.

• Cooling Energy Loss from the Drive Elements

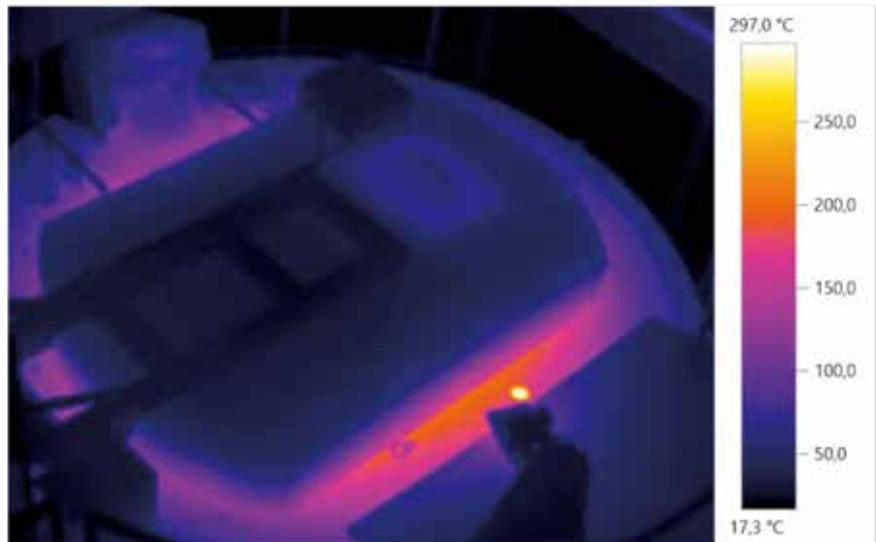
It describes the heat loss that occurs due to cyclically heating-cooling components between the hot zone in the furnace and the cold environment, such as conveyors etc.

• Cooling Water Heat Losses

It describes the heat removed by the cooling water in the cooling areas such as muffles and jackets in the furnaces

8 simple ways to make the energy efficiency of the furnace permanent [8]:

- Monitor the temperature on the cold side of the furnace, carefully checking that there are no hot spots.
- Periodically analyze the composition of the furnace combustion gases, making sure that it continues to deliver the anticipated levels of oxygen and CO.
- Periodically check that the combustion air and fuel flows are in a stoichiometric ratio.
- Check at least twice a year that the burners are in good condition and are undamaged.
- Carry out periodic maintenance to the combustion system.
- Avoid ingress of cold air into the furnace that could affect process efficiency.
- Keep the temperature control loops tuned. If you do not have a temperature control loop, integrate one into the operation.
- Periodically monitor consumption, either manually or automatically. The points that Energy Efficiency Consulting (EVD) companies focus on while conducting industrial furnace studies are listed below [9]:
 - Determination of the energy consumed in the furnaces,
 - Chimney gas analysis,
 - Measurements on the furnace body and side equipment with a thermal camera,
 EVD companies propose an Efficiency Enhancing Project (VAP) about furnaces to the user as a result of their analysis, and if the user



wants to invest in VAPs, they can benefit from the projects to be written and government supports.

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Energy Efficiency with

MICROWAVE

Technology

Do you know the specifications and advantages of Microwave Drying Furnaces in Industrial Facilities?

- Higher process efficiency in shorter times
- Energy transfer instead of temperature transfer
- Homogenous heating with minimum thermal gradient
- Discriminative heating features
- Ability to operate with renewable energy sources
- And much more...

In furnace tests, according to material kind, geometry and moisture, it is **proved** that drying time of the material can be reduced **by minimum 50%** when compared with traditional drying furnaces.

SMC CAN HELP OEMS DEVELOP ENERGY-EFFICIENT MACHINES

OEMs traditionally design their pneumatic machinery and equipment for an operating pressure of 7 bar. However, by reducing this to 4 bar, I know from experience that end users can cut their energy costs by up to 29% in some instances, creating a powerful USP for the OEM. To help achieve such a desirable outcome, increasing numbers of OEMs are engaging with our team of experts here at SMC, who can offer both the know-how and products to turn this concept into reality.

The shift to 4 bar standard operating pressure is already taking place at some large manufacturing companies. While not seeing mainstream adoption just yet, we believe it will become standard practice in the not-too-distant future as regulations tighten and public pressure for more energy-efficient industry grows. With this thought in mind, OEMs must begin preparing for a 4 bar landscape. By making the transition now they can become industry pioneers, not only helping to capture a larger share of a rapidly emerging market, but significantly boosting their corporate image. Sure enough, while this task may at first appear daunting, working with the right technology partner can help ensure a painless changeover. Although the vast majority of machine components will still perform at 4 bar, we should of course keep a close eye on some of them to ensure they operate as intended.

Actuators: pushing ahead

When designing a machine from scratch, it makes sense to start with the components that do the work: the actuators. In general terms, these are the elements that may not perform at their best, or sometimes not at all, using lower pressure. Two variables are key: force and speed. In my experience, actuators in the majority of horizontal ap-



By Roy Schep
Manager Energy Efficiency,
SMC Netherlands

plications operate at lower supply pressure because they are only acting against friction, not force. As a result, it's normal to size actuators for use in horizontal orientations to perform at a certain speed. In vertical applications, however, the story can be different as the cylinder pressure has to overcome the load pressure. These applications tend to be more critical and usually demand specific considerations to ensure the actuator meets its intended objective. Reducing the pressure to 4 bar in vertical applica-

tions may require the use of a larger bore actuator to ensure the required force. If using a larger bore size is an issue due to lack of space, our VBA series pressure boosters can provide the required pressure level in that local part of the application without having to increase the main line pressure, making it possible to use the existing actuator size. In either case, a simple calculation can indicate the theoretical force of the cylinder: $F = P \times A$, where F is force in Newton, P is pressure in bar and A is the effective area of the

cylinder bore in cm². As a point of note, if working at 4 bar demands a larger bore size, the saving in air consumption will offset any additional cost.

One challenge that could arise is that of space. What if a cylinder with a larger bore will not physically fit with your designated design space? Here, scrutiny is required to select a supplier that can provide compact and lightweight actuator solutions. A company such as SMC offers more compact cylinder solutions than its competitors. These products also feature a lower minimum operating pressure and a number of energy-saving concepts. The other option is to use a different technology, such as a double-force cylinder. Again, tapping into the expertise of a reputable pneumatics supplier will prove useful in specifying the optimal solution.

Valves: take control

It's not really high or low pressure that controls actuator speed, but the flow of air it receives. If you need higher speed; the valve will control that for you. With the cylinder bore and force defined, it's possible to select the valve size. We offer directional and process valves with the lowest power consumption, making them ideal for use at 4 bar.

Blowers and vacuum units

When it comes to blowers and vacuum units, higher pressure does not mean higher performance, but quite the opposite, which is why a product like a high-efficiency nozzle has the potential to deliver notable gains.

This solution can maximise air blow efficiency thanks to a more focused blowing impact. Indeed, governed by the Bernoulli Effect, you can improve air blow thrust by 10%.

We recently saw this in action at a customer producing liquid detergent. The company's bottle un-scrambler machine housed 25 air nozzles from an SMC competitor, costing €22,441 in annual air consumption. After application analysis we recommended that the customer adopt our high-efficiency nozzles. These products could provide the same blowing performance (flow and impact force), but with a lower nozzle diameter - thus allowing lower inlet pressure. Reduced air consumption led to savings of €6,183 a year, delivering amortisation in just 1.57 months. Performing the same replacement process on six further lines led to total annual savings of €37,098.

SMC's firm commitment to 4 bar is also visible with our vacuum units, which actually function at their best (maximum efficiency) when using low operating pressure. At 4 bar, we ensure the vacuum pressure necessary to hold the component or product securely. Beyond this pressure, air (and money) is simply wasted and the vacuum unit loses efficiency. By turning up the pressure, you are not getting more force or speed, just more inefficiency.

Regulate to accumulate

As regulators handle point-of-use pressure they can be good collaborators in the 4 bar journey, largely because we can use them to reduce

the pressure even further at points where it's possible. This might include air blow or vacuum applications, endowing the machine with even more energy efficiency. Every little helps.

Monitoring the pressure

Although a pressure switch plays no direct role in the 4 bar concept, it can prove beneficial in the long run. For instance, when designing a machine for 4 bar, you need to monitor pressure as the margin is low. In the first instance, pressure monitoring acts as a control measure for the machine to receive the 4 bar it needs. Secondly, pressure switches can monitor air consumption and identify any pressure losses. Air leakage is something that no machine can afford, especially at 4 bar.

The 4 bar future

OEMs should propose that end users adopt machinery which operates at 4 bar in order to stay competitive. To help expedite a project that involves designing a machine for this operating pressure, SMC's expert team can deliver the optimal outcome for both OEMs and end users. Through early project engagement we can provide the correct sizing for each pneumatic component and ensure it consumes less energy without compromising machine performance. In addition, we can deliver solutions with minimal impact on surrounding or connecting components, thus avoiding any unnecessary time and cost for redesigns. Retrofit projects also benefit from this approach.



Air Preparation Equipment



Fluid Control Equipment



Directional Control Valves

WE HOSTED ORANO EXECUTIVES!



Orano is one of the important players in the nuclear energy sector. It is also a successful group, with more than 17,000 employees worldwide, committed to providing safe, low-carbon and competitive electricity. The goal is

to respond to the energy and environmental problems of the 21st century in the best and most rational way. We recently met with 14 senior executives from France and Turkey of the giant company, which also specializes in waste management.

We toured our factory, where we produce at high quality standards, to the delegation that visited our company, and explained the works we have realized as Sistem Teknik and our future goals. We thank them once again for their visit.





Expertise – Passion – Automation

We work for a sustainable world...



"We care about future generations"

We gain the trust of our customers through our efforts in manufacturing, engineering, sales, management and financial sustainability by providing a sustainable product supply. We produce more energy efficient, compact, lightweight, low carbon footprint and energy efficient products every day in order to not only meet the needs of customers around the world, but also to go beyond these needs.

TRANSFORMING FURNACES WITH SARVION AT THE WORLD GIANT BEARING MANUFACTURER SKF

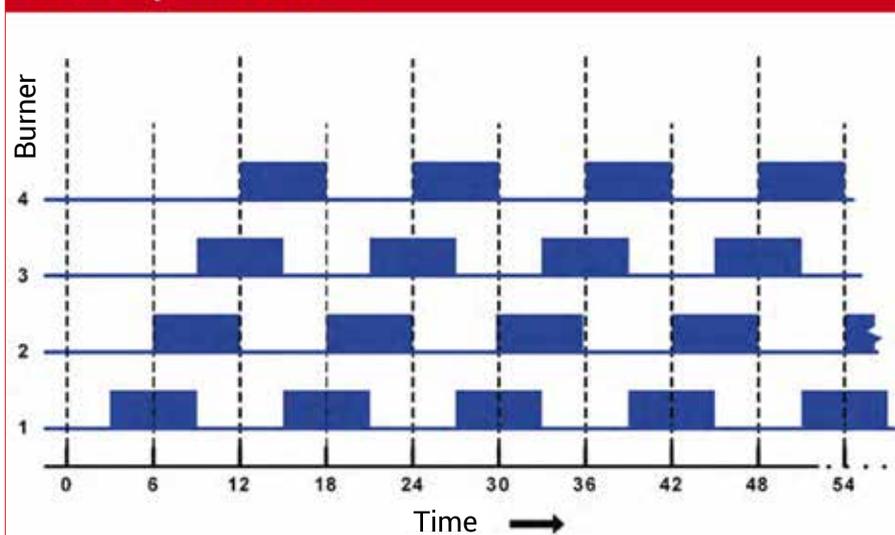
Sarvion, one of the leading companies in the heat treatment industry, signed a successful cooperation with SKF, the world-renowned bearing and felt manufacturing company. You can find the details of the realized project in our article.



As a global brand in bearing manufacturing, SKF has been working on improving industries and daily life since 1907 in order to reduce friction and cost, save energy and time. In addition to provide bearing, felt, test and measurement equipment for so many sectors such as aviation, agriculture, construction, marine, iron-steel, energy, automotive. SKF provides solutions and serve for so many field such as lubrication methods, maintenance products, power transmission solutions for all sectors.

SKF, which has many factories around the world, improves its production capacity and product range, it takes strategic steps by

50% Temperature Need



shifting the equipment in some of its factories to other countries.

Sarvion works as a solution partner for projects carried out in heat treat-

ment facilities, especially for the transportation of furnaces, their development in terms of automation according to needs, and their improvement needs with up-to-date technologies for energy efficiency. Within the scope of the SKF – SARVION project, the modernization and commissioning project of the atmosphere-controlled continuous heat treatment line in the SKF Switzerland factory, where the bearing balls are processed, was carried to the SKF Ukraine factory with great success. The line consists of a rotary base hardening furnace, oil and washing tank, drying unit and tempering furnace. If we talk about the details of modernization in the project;

1- Automatic Loading and Batch Following

Even it carried out different automatic loading unit integration. The loaded materials can be weighed and recorded with the batch number, and different recipes can be automatically selected for different materials.

2. Combustion revision

Significant fuel savings have been achieved in the hardening furnace by integrating self-recuperative burners with low energy consumption instead of the old type burners in the furnace. During the burner commissioning, the air gas settings were made with great precision and the process was approved with the flue gas measurements. Combustion air fan replacement compatible with self-recuperative burners, redesign of gas and air lines and hood system integration is provided.

Combustion Control With Pulse Firing

Pulse Firing is a burner control method and it uses the analog value it receives according to the heat requirement in the furnace as a digital output, allowing the burners to be activated in a cycle.

Pulse Firing provides many benefits

in terms of energy efficiency, homogeneity and NOx emissions.

a) When the burner is ignited, it is activated as it is most efficient according to the heat requirement of the process. In addition, it provides heat transfer with maximum efficiency by using minimum fuel.

b) The ignited burners change with a certain algorithm in the furnace, optimizing the heat transfer applied to the load and providing homogeneity in the furnace.

c) As a result of the healthy formation of the flame in the burner and the prevention of peaks, NOx emissions are minimized.

3- Atmosphere Control Air Panel

Furnace atmosphere control lines have been renewed and are controlled by the natural gas enrichment method. With full automatic automation, atmosphere control is made controllable and all safety measures have been taken according to EN 746-3.



The installation, revision and commissioning of the line was successfully accomplished with the harmonious work of the SKF Ukraine team and the Sarvion team, and with great devotion. In the laboratory results of the first tests with materials after the processes, it was seen that the hardness and decarburization values of the test were at the desired values.



To Watch the Video
QR code

4- Ease of control and maintenance

With the new SCADA system specially written for the heat treatment line, production follow-up, detailed reporting and maintenance follow-up are provided. With the Batch Tracking system developed according to the customer's demand, automatic recipes can be applied according to the product type and the amount of loaded materials, heat treatment time and where they are on the line can be followed. The developed reporting system can be associated with the results from the metallurgical laboratory.

TURKISH MACHINERY MANUFACTURERS MET FOR A GREEN WORLD!

Under the leadership of the Turkish Machinery Federation (MAKFED), the Green Machinery Summit was held on June 16 with the motto "Green Machines, Green World". Important names of the business world attended the summit held in Istanbul and it was emphasized that green transformation is inevitable.

Under the leadership of the Turkish Machinery Federation (MAKFED), the Green Machinery Summit was held on June 16 with the motto "Green Machines, Green World". Important names of the business world attended the summit held in Istanbul and it was emphasized that green transformation is inevitable. Turkey's machinery manufacturers met at the Green Machinery Summit, which addressed the global trend zero carbon target, which is rapidly advancing all over the world, with the title "Green Machines, Green World". The summit was hosted by MAKFED (Machinery Federation),

which gathered many sectoral associations under one roof. Senior executives, association presidents and representatives from various sectors attended the Green Machinery Summit. In addition, important names such as Hasan Büyükdede and Mehmet Fatih Kacır, especially the Minister of Industry and Technology Mustafa Varank, added value to the summit with their participation and speeches. Speakers emphasized the importance of finance, especially in green transformation strategies, and that it cannot be considered separately from digitalization. Industry and Technology Minister, Mustafa

Varank, in his speech, invited the machinery manufacturers of Turkey to contact the Ministry.

"Green transformation is inevitable"

Another person who made statements about the summit was Beste Özdeşlik, a Member of the Board of Directors of EFSİAD and also a Member of the Board of MAİB. Özdeşlik said that the Green Transformation Summit was a very important event for us to understand the importance of the ambitious targets set for 2053, and added: "As MAKFED President Adnan Dalgakıran underlined, ma-



chinery manufacturers, who stand out with their value-added products are on the basis of Turkey's economic power and competitiveness. As industrialists who are aware of the importance of our duty, we have to master the 2053 targets, know what to do on the way to these targets and take action. The summit was very important to explain to machinery producers that green transformation is inevitable, that the next process should be used effectively and that it is inevitable to stay in the game and win in international competition, and to create a common language."

"We have a very important task on us"

Beste Özdeşlik made the following statements in the continuation of her statements: "While we are working towards our goals as machinery manufacturers for our country's economy, it is obvious that we cannot achieve the desired success without government supports and incentives. It is also a great chance for machin-



▲ **Mustafa VARANK**
Minister of Industry and
Technology

ery producers to get support from this relation through MAKFED and MAİB. We saw the importance and the inevitable transformation, and we hope that we have created a common language. After that, we have to create our strategy and action plan that



▲ **Adnan DALGAKIRAN**
MAKFED Head

sets out the goals clearly and charts the way how we can move forward towards those goals. We have a very important task ahead of us, we will be a pioneer in green transformation for a more successful and beautiful country."



SİSTEM TEKNİK SUPPORT FOR SUCCESS BEYOND LIMITS

Çokyaşar Holding, one of Turkey's top 500 exporting companies, reduced its natural gas consumption by 16% with its 2 Pit Type Annealing Furnaces signed by Sistem Teknik. Berk Meydan, Mechanical Maintenance Engineer of the company that opened up to the world from our country, told about this success we achieved together and much more for our magazine's readers.

One of the companies we included in our new issue was Çokyaşar Holding, which opened up to the world from Turkey and proudly represents our country. Today, Çokyaşar Holding, which is among the top 500 exporting companies of our country with its exports to 80 countries of the world, especially Europe, produces products in the field of wire and wire products for various sectors from energy to infrastructure, from automotive supply industry to cable. We came together with Berk Meydan, Mechanical Maintenance Engineer of the exporter company, which has 2 Pit Type Annealing Furnaces signed by Sistem Teknik. Meydan said that there was a 16% reduction in natural gas consumption with our annealing furnaces and added: "Your service and technical support services are also very valuable for us." We would like to thank dear Berk Meydan, once again, for the praising words he said for us, through our magazine; we leave you alone with our interview so that you can better understand both our cooperation and the products and services of the successful company. We wish you good reading.

Hello, first of all, thank you for accepting our interview offer. First of all, could you briefly describe Çokyaşar Holding for our readers?

The foundations of Çokyaşar Holding were laid in 1973 by our Honorary President Ahmet Çokyaşar. Çokyaşar Holding is an industrial company that produces many value-added products in wire and wire products, especially hot-dip galvanized wire, and provides services to many sec-

tors such as energy, infrastructure, cable, automotive sub-industry, construction and agriculture, and environmental and security systems with its various products. The production facilities of Çokyaşar Holding, headquartered in Istanbul, are located in Silivri district of Istanbul, in Düzce, Adana and Elbasan/Albania. It is one of the largest industrial establishments, which is among the first 500 export companies and 500 industrial establishments of Turkey with its exports to 80 countries in the world, especially Europe, the Middle East and America. Acting with the experience and expertise of being in commercial activity and being in the production of industrial products for 49 years, Çokyaşar Holding continues its mission in the sector with the awareness of its responsibility arising from its contributions to its customers and the Turkish economy. At the same



Berk MEYDAN
Çokyaşar Holding
Mechanical Maintenance Engineer

Mechanical Maintenance Engineer Berk Meydan, who answered our questions sincerely, works at Çokyaşar Holding's factory in Silivri, Istanbul. Meydan takes an active role in energy efficiency projects apart from mechanical maintenance.



time, Çokyaşar Holding has proven its responsibility to its customers, quality, employees and the environment by obtaining ISO 9001, ISO 14001, ISO 27001, ISO 45001, ISO 500001, TSE EN 10244-2, TSE EN 10223-1, TSE EN 10223-6, TSE EN 10223-7 certificates. Our companies operating in the steel wire and aluminum sector were gathered under a single roof under the name of Çokyaşar Holding under the "Corporate Transformation Project".

Well, can you tell us about the intersections of Sistem Teknik and Çokyaşar Holding? Which products and services of Sistem Teknik do you use?

There are 2 Pit Type Annealing Furnaces, of which you are the manufacturer, in our enterprise. We receive your technical support regarding the malfunctions that may occur in annealing furnaces. Also, we supply the spare materials used in the furnaces from your company.

What do you think are the main advantages of Sistem Teknik furnaces in use?

First of all, you are always with your customers. You are constantly improving your customers and yourself. Homogeneous annealing is ensured thanks to well-made circulation. By using the waste heat discharged from the chimney, the energy cost is reduced. Since the furnace capacities are large, we can anneal 6 tons of wire in one charge.

Today, energy efficiency and cost reduction have become a priority target in every sector. Could you tell us a little about the solutions you have produced so that Industrial Furnaces, which are an important part of your production in terms of energy cost, can work more efficiently?

In order for the furnaces to work efficiently, we have the burner maintenance done on a 6-month or annual basis without interruption. By checking the outer and inner surface



insulations, we make the changes if there are any deformed places. We reduce energy costs by reusing the waste heat of industrial furnaces for furnace heating. We check the quality of combustion in the furnace by measuring the flue values on a daily basis and intervene if there is a problem.

We know that you have recently completed a VAP project specific to furnaces, can you share the results and achievements of the project?

As Özyaşar Tel ve Galvanizleme Inc., we have completed 2 energy efficiency (VAP) projects and we have received approval for 3 projects by submitting them to the Ministry of Energy. We plan to complete them by the end of 2022. The 5 projects I mentioned are high-cost energy efficiency projects approved by the Ministry of Energy. In addition to the Ministry-approved projects, we realized 8 projects with lower costs. At the end of the projects, we observed

a decrease of 18% in our energy consumption. Among the projects we have completed, we have changed the inner surface insulation of the Pit Type Wire Annealing Furnace that we purchased from your company. With your support in this regard, our natural gas consumption decreased by 16%. By minimizing the heat losses in the furnaces, we ensured homogeneous heat distribution in the furnaces. This has increased our production quality. Energy efficiency does not only mean the correct use of energy, it also means increasing the production quality.

Finally, can you evaluate the service and support services that Sistem Teknik provides you?

The priority for us is to solve the problems we experience as soon as possible and permanently. From this point of view, your service and technical support services are very valuable for us. Your stock of spare parts for our furnaces also pleases us.



FURNACES OF BGH KOCAELİ ÖZEL ÇELİK INC. ARE FROM SİSTEM TEKNİK

BGH is one of Germany's most established steel producers. By the Turkey branch of the successful company, BGH Kocaeli Özel Çelik A.Ş., a new facility was opened on 26 July 2022 applies heat treatment for hot-cold tool steels.

A first in the world

As Sistem Teknik, we produced and installed the Vacuum Gas Quench Furnace, Vacuum Tempering Furnace and Closed Loop Water System for the facility that brings together the German BGH quality with the Turkish industry sector. The furnaces feature high quality, compact design and environmental friendliness. On the other hand, they draw



attention with their easy usage and energy efficiency. With this facility, BGH realized the first heat treatment

investment in steel service centers in the world, together with Sistem Teknik.





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ST SİSTEM TEKNİK
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ENERGY EFFICIENCY MODULE MSE6-C2M FROM FESTO REVOLUTIONISES COMPRESSED AIR SYSTEMS

Leading industrial companies from the automotive, pharmaceutical and food industries have clear CO2 targets for their products. These require machine builders to make significant energy savings in new machine generations compared with previous machines. This is precisely why Festo offers an unrivalled solution in the global compressed air system market with its energy efficiency module MSE6-C2M.

The energy efficiency module MSE6-C2M from Festo is a global pioneer in monitoring compressed air consumption and supply, automatically detecting leaks as well as the speed of return on investment. This ensures that machines and systems are always available.

Reducing compressed air consumption

When it comes to condition monitoring in compressed air systems, the energy efficiency module not only enables measurement data to be gathered and analysed, but it can also automatically reduce consumption by actively intervening in the supply. Thanks to patented technology from Festo, users can save up to 3.2 metric tons of CO2 and hundreds of euros in operating costs per year, as revealed by calculations and tests. This works in a similar way to the automatic stop/start system in a modern car so that no more energy is wasted.

Ready for Industry 4.0

The lower pressure level saves energy, without completely depressurising the system. This means that machines and systems are permanently available. The MSE6-C2M can automatically detect leakages occurring over time and reports these to a controller. It can be fully integrated into the machine network via PROFINET. All measured values such as pressure, flow rate or system parameters are available in the PLC or cloud and can be

displayed or individually further processed.

All values in view

Measured values for flow rate, air consumption and pressure can be called up at any time. System operators can use this information as the basis for continuous intelligent energy monitoring of a machine. With the MSE6-C2M it is possible, for example, to determine whether a system is consuming more air now than a year ago, how much compressed air is needed for a production batch, whether the pressure is correctly adjusted or how high the pressure and flow rate were at the time of a machine failure.

About Festo:

Festo is a global player and an independent family-owned company

with headquarters in Esslingen am Neckar, Germany. The company supplies pneumatic and electrical automation technology to 300,000 customers of factory and process automation in over 35 industries. The products and services are available in 176 countries. With about 21,000 employees in over 250 branch offices in 61 countries worldwide, Festo achieved a turnover of around €3.07 billion in 2019. Each year around 8% of this turnover is invested in research and development. In this learning company, 1.5% of turnover is invested in basic and further training. Yet training services are not only provided for Festo's own staff – Festo Didactic SE also supplies basic and further training programmes in the field of automation technology for customers, students and trainees.



 MSE6-C2M energy efficiency module

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equipment and secure connectivity

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OF PRODUCTIVITY.**

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QUALITY CONTROL AT INTERNATIONAL STANDARDS FROM KARTAL BOMBE

Kartal Bombe, which closely follows technological developments and always prioritizes customer satisfaction, does not compromise on quality in all areas it offers products and services and carries out its controls at international standards.

All products produced at Kartal Bombe ve Basınçlı Kaplar Inc. are checked for each order via KBS kiosk and hand terminals. All traceability of the product, starting from the acceptance of material entry, including all necessary intermediate and final controls, until the shipment stage is followed by the ERP program.

Aim; Contribution to country development

Approved procedures, instructions, inspection and test plans (ITP) for quality control activities carried out

within the scope of manufacturing processes and activities are carried out by qualified quality personnel. The goal of the successful company is to contribute to the development of the country in accordance with the contracts, specifications and drawings made with the customers in a way that fully meets the customer's requirements. All equipment and fittings used in the quality control phase are calibrated by accredited institutions, and they are monitored periodically. The EN 10204 / 2.1, 2.2, 3.1 and 3.2 certifications of the ma-

terials are delivered by performing the necessary tests and controls according to the relevant standards and customer demands. At the same time, all destructive and non-destructive tests are carried out by KBS Kartal Bombe.



Non-Destructive Tests:

- Visual Inspection
- Magnetic Particle Test
- Penetrant Test
- Ultrasonic Inspection
- Radiographic Examination
- PMI Test

Destructive Tests:

- Bending Test
- Tensile Test
- Notch Impact Test
- Compression Test
- Micro and Macro Tests
- Z test
- Hardness Measurement Tests (Vickers, Brinell, Rockwell)

- Camber ■ Profile, Pipe, Cylinder Twisting ■ Heat Treatment
- Tank Accessory ■ Pressure Equipment...



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



KARTAL BOMBE SANAYİ

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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Eagleye PDR[®] (Portable Data Recorder)

Provides software and hardware that meet industry standards for TUS by generating reports that address the AMS2750 and CQI-9 specifications.

Multi-Channel Data Logger

The durable and portable data logger is easy to use and can be used in many industrial applications that require recording, trending and reporting. Eagleye PDR[®] includes 15 channels with user-defined inputs for each channel. Eagleye PDR[®] includes software for managing tests and creating custom reports based on test results.



Eagleye PDR[®] Features

- Designed for industrial environments
- Specially designed for TUS
- Meets AMS 2750 and CQI-9 registration and reporting requirements
- AC (90-264 VAC) 47-63HZ and DC power
- Approximately 8 hours of battery life
- Dimensions: W:400mm x H:310mm x D:210mm
- Password protected menu options
- User defined recording intervals
- Easy calibration
- Ethernet and USB connection to PC
- 800 x 480 color touchscreen

Eagleye AGA[®] (Atmosphere Gas Analyzer)

It measures the atmospheric gases of heat treatment furnaces containing a protective atmosphere. You can evaluate the performance of your Endogas/Exogas generators and the condition of your catalysts. You can control your oxygen probe with the atmosphere gas in your furnaces.

Measuring Range

CO: 0-50% O2: 0-25% (Optional)
CO2: 0-5% H2: 0-100% (Optional)
CH4: 0-10% Carbon: 0-2% (Calculated)



Carbon measurement based on gas composition

- Easy to use, operator training in minutes
- Long life rechargeable battery
- Infrared sensor
- 7" touch screen
- Atmosphere measurement in accordance with CQI-9 and AMS-2750
- Real-time recording and graphical display
- Built-in sampling pump
- Zero/Span calibration
- Ethernet/USB connection to PC
- AC (90-264 VAG) universal power supply

FOR ENGINEERING SOLUTIONS AND BOUTIQUE PRODUCTION PREFER BAYKAL REZİSTANS

Industrial Heating Elements Most Preferred Producer of Turkey

Since 1970, Baykal Rezistans is serving unlimited and excellent services to his customers. Now, our company is just producing industrial heating element for his special customers. Baykal Rezistans presents high level engineering services to approximately ten thousand customers all around the world, with boutique and customer based exclusive service philosophy. 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.



*Industrial Furnace Heater

Industrial Furnace Heating Elements are heat treatment systems that enable the internal environments of the furnaces to reach the desired temperature values. are the types of heaters used in the oven. Oven interior use at the same time in different types and usage sizes Production is carried out in the quality of Baykal Rezistans, according to the temperatures.

Types of Heaters According to Maximum Temperatures in the Oven

- » Tubular Heaters (Maximum 700°C)
- » Spiral Wound Heaters (Maximum 1100°C)
- » Metal Sheathed Ceramic Carrier Supported Heaters (Maximum 1200 °C)
- » Silicon Carbide Heaters (Maximum 1400 °C)



*Industrial Furnace Heater

A wide range of customer needs in all your processes that require heat treatment from the best manufactured products that you will prefer as a welcome tool.

You can use it as one of these types of customers together with its expert personnel. You can work with Baykal Rezistans, our team that offers expert solutions in terms of experience. A strong infrastructure and With its 100% solution-oriented approach, you can always manufacture industrial furnaces and equipment. Take advantage of the right furnace heater types in your processes. A heat treatment furnace, also known as a high-temperature heater Today, the heaters are up to 1400 degrees Celsius with a special ceramic material and high degree structure. It is produced by being manufactured from resistance wire together. Today, according to the types of furnaces, suitable for the desired projects As Baykal Rezistans, we provide the production in the dimensions you want. Anything you want at the special production point you can reach anytime, you can also stay in touch for information and support.

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IEP ENERGY PETROLEUM INSTITUTE

IEP ATEX

(1) **EU-Type Examination Certificate**

(2) **Equipment or Protective Systems Intended for use in Potentially Explosive Atmospheres**
Directive 2014/34/EU

(3) **EU – Type Examination Certificate Number: IEP 21 ATEX 1006X**

(4) **Equipment: BEX-X type Heaters**

(5) **Manufacturer: BAYKAL REZİSTANS SAN. TİC. LTD. ŞTİ.**

(6) **Firm Address: İktisadi O.S.B. Eskoop San. Sit. C1/2 Blok No:16-18-20 Başakşehir/ İstanbul, TURKEY**

(7) This equipment or protective system and any of acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

(8) The IEP Ulaştırması Enerji Petrol Ölçüm, Sertifikasyon ve Teknik Hizmetler Organizasyonu Tic. Ltd. Şti., notified body number 2284 in accordance with Article 17 of the Directive 2014/34/EU of European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres, given in Annex II to the Directive. The examination and test results are recorded in confidential Report Nr: IEP-Rp.Ex.10-2014 date 25.10.2021.

(9) Compliance with Essential Health and safety requirements has been assured by compliance with:
EN IEC 60079-0:2018 , EN 60079-1:2014, EN 60079-31:2014

(10) If the sign "X" is placed after the certificate number, it indicates that the product is subject to Specified Conditions of Safe Use specified in the schedule to this certificate.

(11) This EU-Type Examination Certificate relates only to the design and construction of the specified product in accordance to the directive 2014/34/EU. Further requirements of the directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

(12) The marking of the equipment or protective system shall include the following:

**Ex II 2G Ex db IIB T1...T6 Gb
II 2D Ex db IIC T440°C...T80°C Db**

Responsible Person:
Nurcin Terzioğlu
Head of Certification Body

Date of Issue: 05.11.2021

IEP Ulaştırması Enerji Petrol Ölçüm, Sertifikasyon ve Teknik Hs. Org. Tic. Ltd. Şti.
37463 Sok. No:9 K:2 Beşiktaş - İSTANBUL / TÜRKİYE
Tic. Sic. No: 282431/17 45 - 46 Fax: +90 212 431 11 30 E-mail: iep@iep.com.tr F: 45
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IEP ENERGY PETROLEUM INSTITUTE

IEP ATEX

(13) **Schedule**

(14) **Certificate Nr: IEP 21 ATEX 1006X**

(15) **Description of Equipment:**

The equipment consists of terminal compartment and operating compartment. The terminal compartment is equipped with d type ex-proof cable gland. ATEX certified flameproof enclosure (Zone 1, Ex d) has been chosen for the electrical connection. (LCIE 11 ATEX 3108X) The Heaters are made of stainless-steel materials. All tests were carried out according to EN 60079-0, EN 60079-1 and EN 60079-31 standards. There is a thermostat inside the junction box to prevent overheating.

Technical Specifications:

TYPES	BEX-F	BEX-K
Connection style	flanged; DN15-DN600	thread connections; BSP-NPT-BSPT- METRIC 1/2"-3"
Power of Heating Element		0,1 kW- 960kW
Voltage	24V-500V / 50-60 Hz	24V-500V / 50-60 Hz
Max. Design Pressure	30 - 90 Bar	30 - 90 Bar
Terminal Box	d type ATEX certified flameproof enclosure (LCIE 11 ATEX 3108X)	
Heating Elements	Copper & stainless steel or Incolloy 600/800/825 as per project specific specifications	
Degree of Protection (Housing)	IP 65/68	IP 65/68
Ambient Temperature	-40°C to +50°C	

(16) **Essential Health and Safety Requirements:**
This certificate is in the contents of standards that mentioned in item [9]. It has been accepted that Heaters are manufactured according to the producer instructions and the standards mentioned above.

(17) **Special Conditions for Safe Use:**
17.1 The cable and conduit entry devices shall be of a certified flameproof type Ex d, suitable for the conditions of use and correctly installed.
17.2 Unused apertures shall be closed with Ex d blanking elements.
17.3 The meaning of X: To must be installed by authorized personnel according to the user manual and EN 60079-14. Periodic inspection should be carried out by authorized personnel according to EN 60079-17.

(18) **List of Documentation:**
• Drawings:

Drawings No:	Date
BEX-F-0001 - 01...06	20.09.2021
BEX-F-0002 - 01...06	20.09.2021
BEX-K-0001 - 01...06	20.09.2021

For the validity of analysis type certificate, the parts that are used Heaters are determined in confirmed in the list of equipment 1 page, dated 01.07.2021. If parts other than the approved equipment list are used, the certificate is invalid.

Responsible Person:
Nurcin Terzioğlu
Head of Certification Body

Date of Issue: 05.11.2021

Exproof Heaters

Atex Certified Industrial Heaters

- In flammable and explosive areas safe use
- Atex Certified
- Industrial Design
- Engineering Solutions



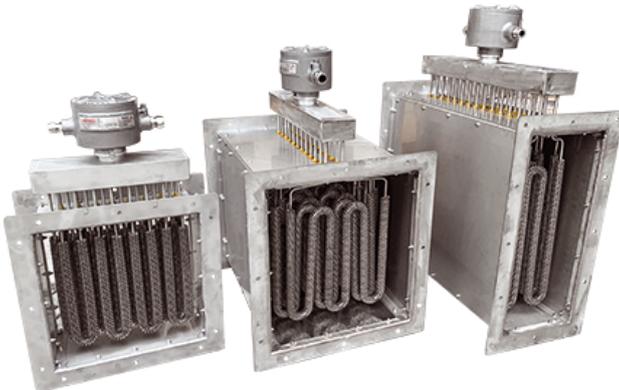
SUPERIOR ENGINEERING

ENGINEERING SOLUTIONS IN INDUSTRIAL HEATERS



50 YEARS OF EXPERIENCE

BAYKAL REZISTANS CONTINUES TO GROW WITH MORE THAN 10.000 CUSTOMERS



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.

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.

ATEX CERTIFIED HEATERS MANUFACTURING IN TURKEY WE EXPERIENCE THE JUSTIFIED PRIDE OF BEING THE FIRST AND ONLY

Exproof Heaters Exproof Tubular Heaters can be used for a wide variety of purposes. It is used safely in the chemical and petrochemical industry, in industrial processes, oil platforms, military facilities and many other places, in areas where an explosive atmosphere may occur, in environments where substances are stored, processed or produced.

As Baykal Rezistans, we are the pioneer and only company in Turkey in the production of Atex-certified industrial heaters.

Engineering
services in
**Electrical
Heating**

Boutique
Production



WHAT'S OUR
SERVICE?

- Tubular Heating Elements
- Explosion Proof Heaters
- Finned Heaters
- Industrial Furnace Heater
- All Other Electrical Heating Systems

**Engineering
Solution in
Industrial
Heating**

All Baykal Rezistans customers
are special and privileged

50
Years of
Experience



Contact Us
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export@baykalrezistans.com

SUCCESS BEYOND LIMITS FROM SİSTEM TEKNİK

The reputation of Vacuum Drying Furnaces signed by Sistem Teknik, which is equipped with the latest technology, and a wonder of innovation, continues to exceed the borders of the country. Our Vacuum Drying Furnace, which was transported on June 9, met with its buyer. The 65-tonne furnace was loaded in one piece and shipped to Bulgaria. Our furnace, whose installation was completed on August 4, successfully passed all the tests and started its activities.

Production capacity increased

The prominent features of the furnace, which was meticulously shipped to Bulgaria, are as follows: By starting the drying process under vacuum, the processing time, which was completed in 48 hours in conventional furnace, was reduced to 8



hours, thus the production capacity has been increased by 6 times. The benefits of this capacity increase has the same savings ratio in time, energy and costs.

The internal structure of the furnace was designed to be manufactured

from 100% special alloy steel. With this design, which significantly increases the life of the furnace; maintenance costs have been reduced, the number of planned downtimes has been decreased, and unplanned downtimes have been prevented.



HOW DO WE ENSURE THE HIGH ENERGY EFFICIENCY IN OUR FURNACES?

- Furnace energy and exergy balance detail calculations,
- Simulations made to ensure temperature homogeneity,
- Protective atmosphere flow rates determined according to needs and,
- Using top quality insulating materials, combustion equipment and resistors.



WE ARE PROUD AND HAPPY!



We continue to invest in technology with our many years of sectoral experience, our engineers who are competent in their fields, and our teammates who are passionate about their work. We are happy to be rewarded for the work we have done for the development of our industry and our country. We are proud. Because our invention named "Conveyor Tension System in Industrial Furnaces" was able to obtain a patent by the Turkish Patent and Trademark Office under the Industrial Property Law No. 6769. We would like to thank all our team who contributed to this success once again through our magazine.

Contribution to energy efficiency

The highlights of our invention called "Conveyor Tension System in Industrial Furnaces" are as follows: With the use of wire conveyor, maximum heat transfer was achieved by increasing the visibility factor bet-

ween the material and the heating surface and minimizing the surface area of the conveyor in infrared heating systems where radiative heat transfer is dominant. With the tension system, instead of a one-piece endless sling, it is possible to intervene locally in case of any wire breakage, with 16 rows of indepen-

dently driven wires. With 6 rows of spare wires permanently placed in the system, it is possible to reactivate the system with minimum maintenance time in case of wire breaks. At the same time, thanks to the reduced conveyor mass, a decrease in heating capacity contributes to energy efficiency.



“We Trust You, Let’s Do it Globally !”

Türkiye'nin Refrakteri

United Refractories Co. ile yaptığımız lisans anlaşmasıyla monolitik refrakter üretimine başlamış olmaktan gurur duyuyoruz.



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Tepeören 34959 Tuzla / İstanbul / Türkiye

Tel: +90 216 467 31 40 Fax: +90 216 467 31 45

Email: akm@akm.com.tr akm.com.tr



AKM 30. YIL

Birlikte daha ileriye



/akmmetalurji

VF-TE-DC SERIES VACUUM TEMPERING FURNACE

TIMES IS MONEY

■ RAPID HEATING RAPID COOLING



■ VF-TE-DC SERIES VACUUM TEMPERING FURNACE

Model Number	Sizes	Charge Capacity (kg)	Heating Power (kWh)
VF-TE-DC-696	600x900x600	1000	140
VF-TE-DC-9129	900x1200x900	1500	220
VF-TE-DC-101510	1000x1500x1000	2000	260



ES RS ML



Agent
Lobby

Work Labs

Press
Center

Toilettes

Stage



**VISIT OUR
BOOTH**

HK 2022
Härtereikongress

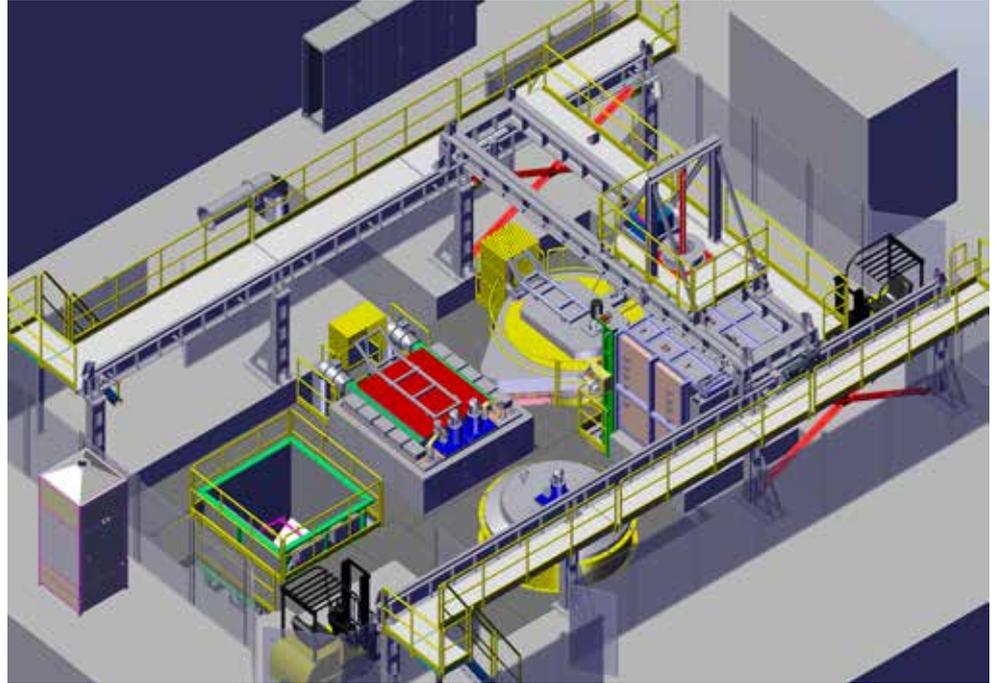
11-13 OCTOBER
KOELNMESSE EXHIBITION CENTRE – GERMANY
E-048



TOSB - Otomotiv Yan Sanayi İhtisas OSB 1. Cad. 15 Yol No:1 41420 Çayırova / Kocaeli / TURKEY
Tel : +90 262 658 29 14 Fax: +90 262 658 18 19 www.sistemteknik.com sales.steel@sistemteknik.com

HIGH SECURITY AUSTEMPERING FACILITY WAS ESTABLISHED

A fully automatic high temperature austempering plant was established for the heat treatment of super-alloyed steel. The facility includes an Annealing Furnace, High Temperature Molten Salt Bath, Low Temperature Molten Salt Bath, Spare Molten Salt Bath, Manipulator and Salt Recovery Unit. One of the important features of the facility is the reuse of molten salt with recovery. This provides a high cost advantage. The Austempering Facility also draws attention as a highly secure facility in terms of occupational safety.



PETROFER PRODUCT LIST

* HEAT TREATMENT PRODUCTS

- Heat Treatment Oils
- Synthetic Heat Treatment Media
- Heat Treatment Salts
- Special Products for Heat Treatment
 - Blackening Products
 - Carburizing Protection Pastes

* DIE CASTING PRODUCTS

- Die Face Lubricants & Piston Lubricants
- Special Products for Die Casting Processes

* FORGING PRODUCTS

- Forging Oils
- Special Products for Forging Processes

* FIRE RESISTANT HYDRAULIC FLUIDS

- HFA – Water Based Synthetic Hydraulic Fluids
- HFC – Water Glycol Based Hydraulic Fluids
- HFD-U – Polyol Ester Based Hydraulic Fluids
- HFD-R – Phosphate Ester Based Hydraulic Fluids

* METAL WORKING PRODUCTS

- Water Miscible Metal Working Products
- Neat Metal Working Oils
- Wire Drawing Lubricants
- Hot and Cold Forming Lubricants
- Electroerosion Fluids

* RUST PREVENTIVES

- Rust Preventive Fluids
- Water Displacing Rust Preventives
- Water Miscible Rust Preventives
- Special Products

* HEAT TRANSFER MEDIA

- Heat Transfer Oils
- Synthetic Heat Transfer Lubricants
- Heat Transfer Salts
- Cleaners for Heat Transfer Systems

* GREASES

- Greases for General Purpose Greases
- Greases for Iron and Steel Industry
- Greases for Mining Industry
- Greases for Cement Industry

* INDUSTRIAL LUBRICANTS

- Hydraulic Oils
- Fire Resistant Hydraulic Fluids
- Gearbox Oils
- Slideway Oils
- Compressor Oils
- System Circulation Oils
- General Purpose Lubricants

* PAPER CHEMICALS (TISSUE CHEMICALS)

Coating Chemicals for Tissue Paper

- Release Agents
- Softeners
- Cleaners
- Micro biocides (Bacteria, Yeast and Fungi Protectors)
- Anti-Foaming Agents
- Cutting and Grinding Fluids for Dr. Blade and Yankee Surface
- Glues

* RUBBER PROCESSING OILS

* MOULD RELEASE LUBRICANTS

- Mould Oils for Continuous Steel Casting Process (at Iron and Steel Factories)
- Mould Oils for Concrete Manufacturing
- Mould Release Agents for Rubber Industry
- Mould Release Agents for Wood Industry
- Mould Release Agents for Polyurethane Materials

* WIRE ROPE LUBRICANTS

* CONCRETE LUBRICANTS

* CLEANING AND MAINTENANCE PRODUCTS

- Industrial Cleaners
- Cleaning Products for Water Miscible Coolants
- Die Cleaners
- Bacteria / Yeast / Fungi Eliminators
- Band Skimmers, Centrifuges and Service Equipments
- Mixers

* SPECIAL PRODUCTS

- Fluxing Agent for Break Processes
- Fuel Additives

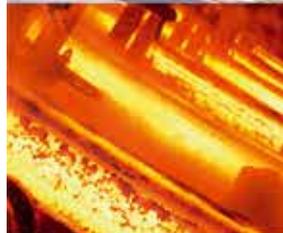


PETROFER
industrial oils and chemicals

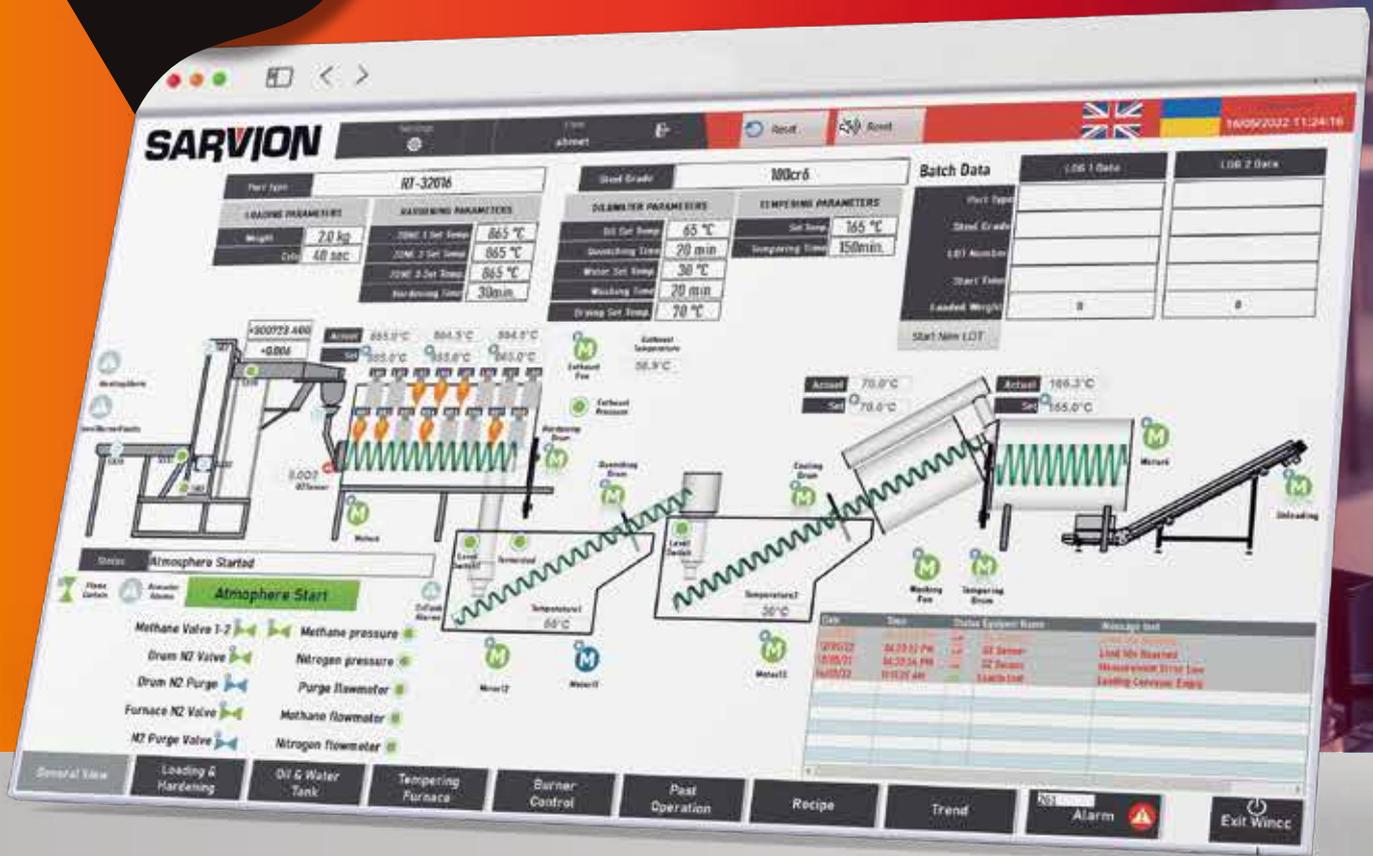
PETROFER ENDÜSTRİYEL YAĞLAR SANAYİ ve TİCARET A.Ş.

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**STAY
TODAY!**

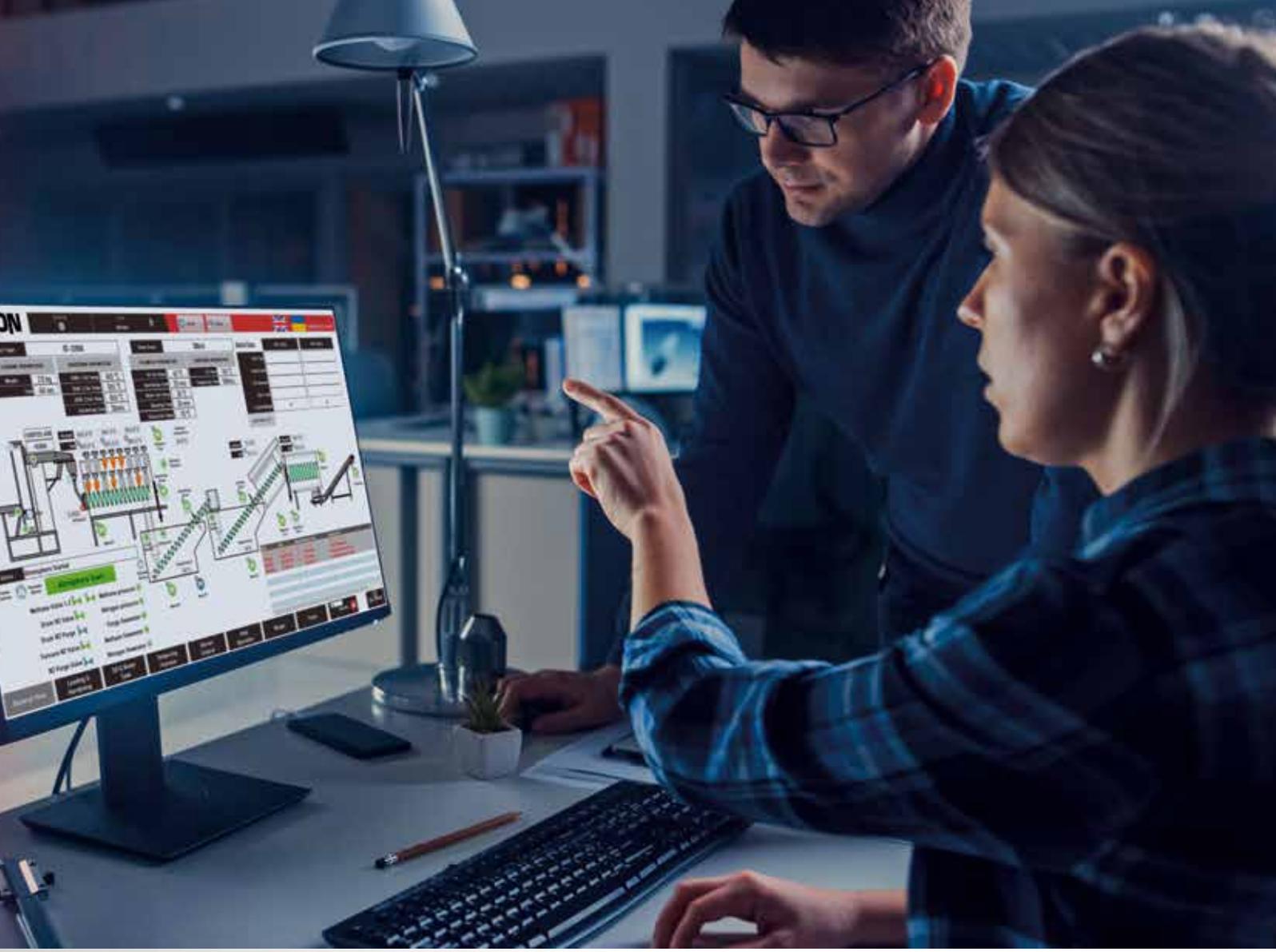


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With the effective control of your industrial heat treatment furnaces;

- efficient process and effective follow-up,
- labor and time savings,
- increase in production quality,
- failure analysis and predictive maintenance,
- minimizing risks and work accidents,
- reporting according to standards (ams 2750, cqi-9)

and to reach special solutions for your needs, contact us.



YOUR
pattern
IN THE HEAT
TREATMENT INDUSTRY
SARVION

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PHD-4 PORTABLE LEAK DETECTOR FOR TESTING UNDERGROUND STORAGE TANKS

Leak Testing for Underground Storage
of Hazardous Materials



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

What Is PHD-4?

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

• Why Helium?

Due to the low concentration of helium in the atmosphere (only 5 ppm), very small leaks can be detected.

Helium is non-reactive with other chemicals.

Helium as a tracer gas is advantageous because it is non-toxic, non-flammable, inexpensive, and quickly diffuses through small leaks.

• Easily permeates earth and asphalt.

1- Leak Detection At Initial Installation

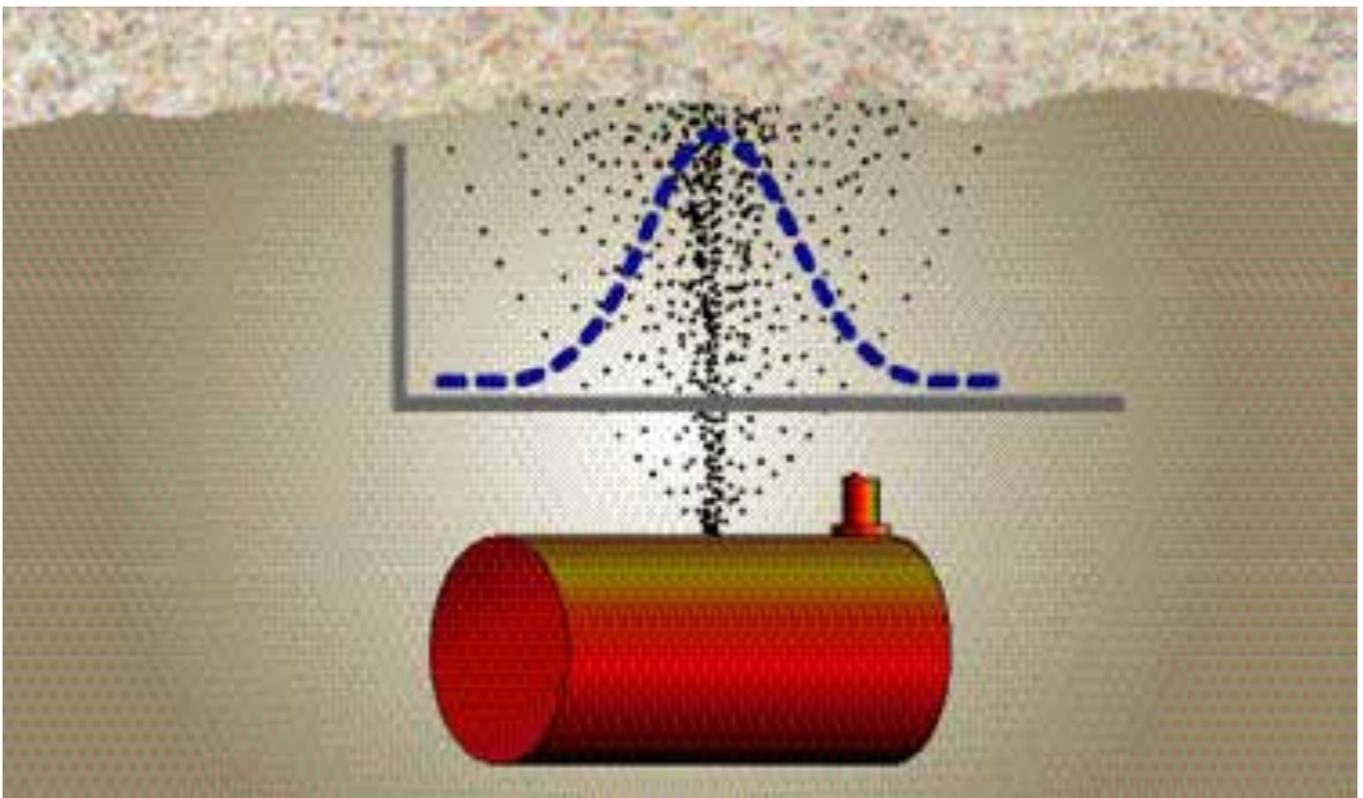
2- Post Installation Leak Detection

• Leak Detection At Initial Installation

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



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



primary pipe is caught by the secondary pipe. Since piping runs are pitched back toward the sump area, any captured product flows in that direction to help insure containment.

Generally, testing of the tank top and piping in a new installation proceeds as follows:

- Adequately seal all tank and piping penetrations.
- Apply helium flow to one end of the system and monitor helium flow at the opposite and farthest end of the system to insure flushing of the ambient air within and to make sure that helium has reached all components.

- Seal the downstream penetration and pressurize the system with welding grade helium. Although higher total pressures will increase the flow rate at leak sites and make smaller leaks easier to detect, one hundred percent helium is not necessarily required. Once the system is flushed and helium is added, the total pressure can be increased with air or nitrogen. When testing the primary piping using the PHD-4 helium "sniffer", the secondary piping can often be used to help contain any leaking helium. An accumulation effect occurs, making detection easier. In these cases, once the primary system is found to be leak free, the secondary piping can be sealed. Then, using a similar process, this secondary containment area, the interstitial space between pipes, can be flushed, pressurized with helium, and checked for potential leaks.

• Post Installation Leak Detection

Leak detection of a previously installed UST can be much more

challenging since the tank and most of the piping are less accessible. These sites also typically have a layer of concrete or asphalt at the surface. The system must be flushed of air and pressurized with helium as described earlier, and leak detection must be performed through the layers of dirt, sand, gravel, concrete, etc. Helium will pass through all substrates but will not always follow a straight-line path to the surface. To aid in finding the precise location of the leak site, holes may be drilled through the concrete at regular intervals along and directly over the piping runs. Once pressurization and a short dwell time are accomplished, the PHD-4 probe is placed at each of these holes to determine the approximate location of the leak.

Tape or some other material is placed over the hole during the dwell period to permit an accumulation effect and make the detection method more sensitive. Proper execution of this method can significantly reduce the amount of excavation required to repair leaks at an existing UST site.

• Why PHD-4 ?

High Selectivity PHD-4 is sensitive only to helium. There are no false signals due to the presence of any other gases.

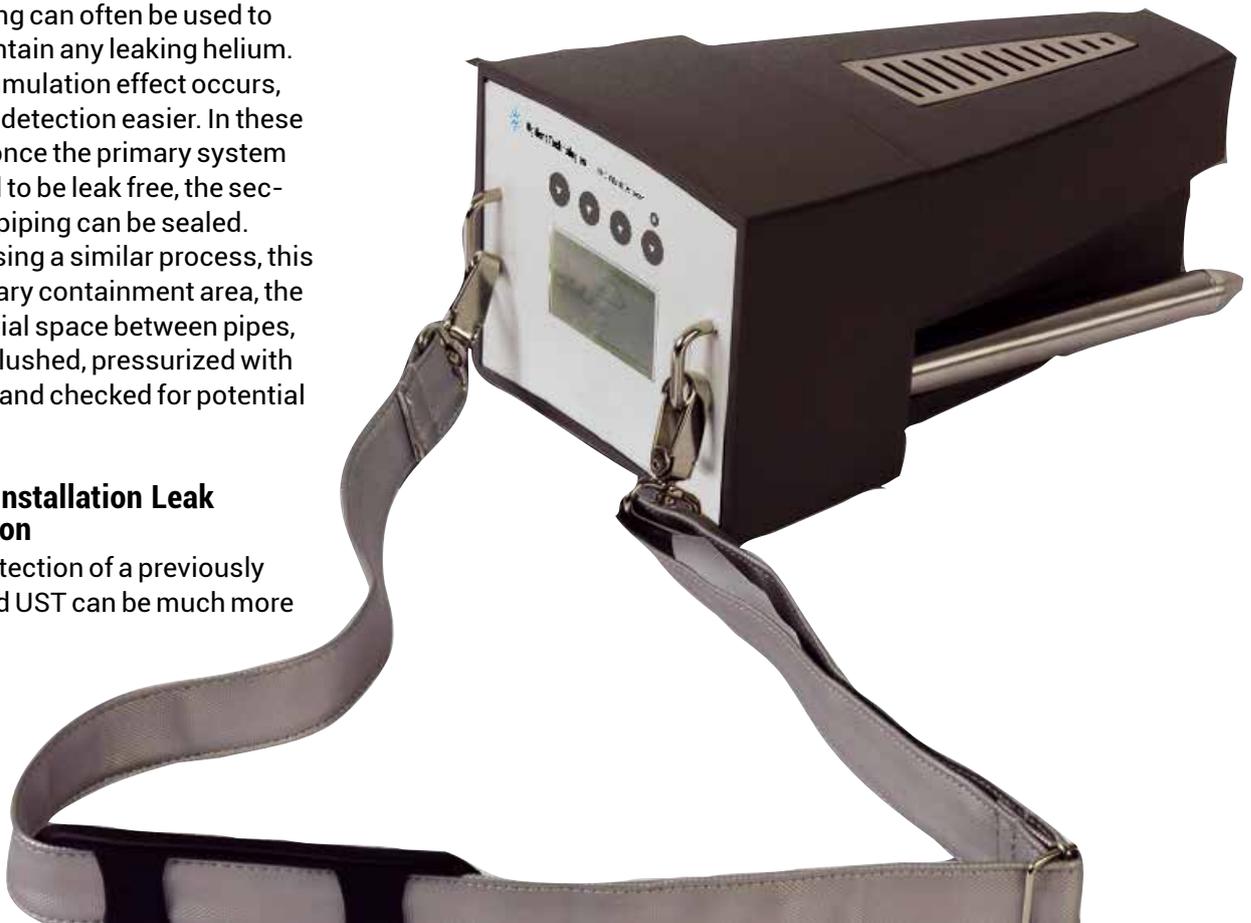
High Sensitivity PHD-4 is nearly as sensitive to small leaks as a more expensive mass spectrometer leak detector used in the sniffing mode. This allows precise location of the leak which helps minimize excavation costs.

Battery Operated PHD-4 can be operated without a main power supply or power generator. Up to 4 hours on a single charge.

Simple Operation PHD-4 is very easy to use and does not require any special operator training. All the active menus of the PHD-4 are available in four languages. Specifically designed for underground testing (see sampling probe in photo on page 3).

Very Low Maintenance Replacement of sampling line filters is straightforward and requires only a screwdriver. Portable PHD-4 is lightweight, portable and easy to carry, even to the most difficult leak check locations. It weighs only 2.6 kg.

Torrvac Mühendislik A.Ş
T: +902166064067





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.

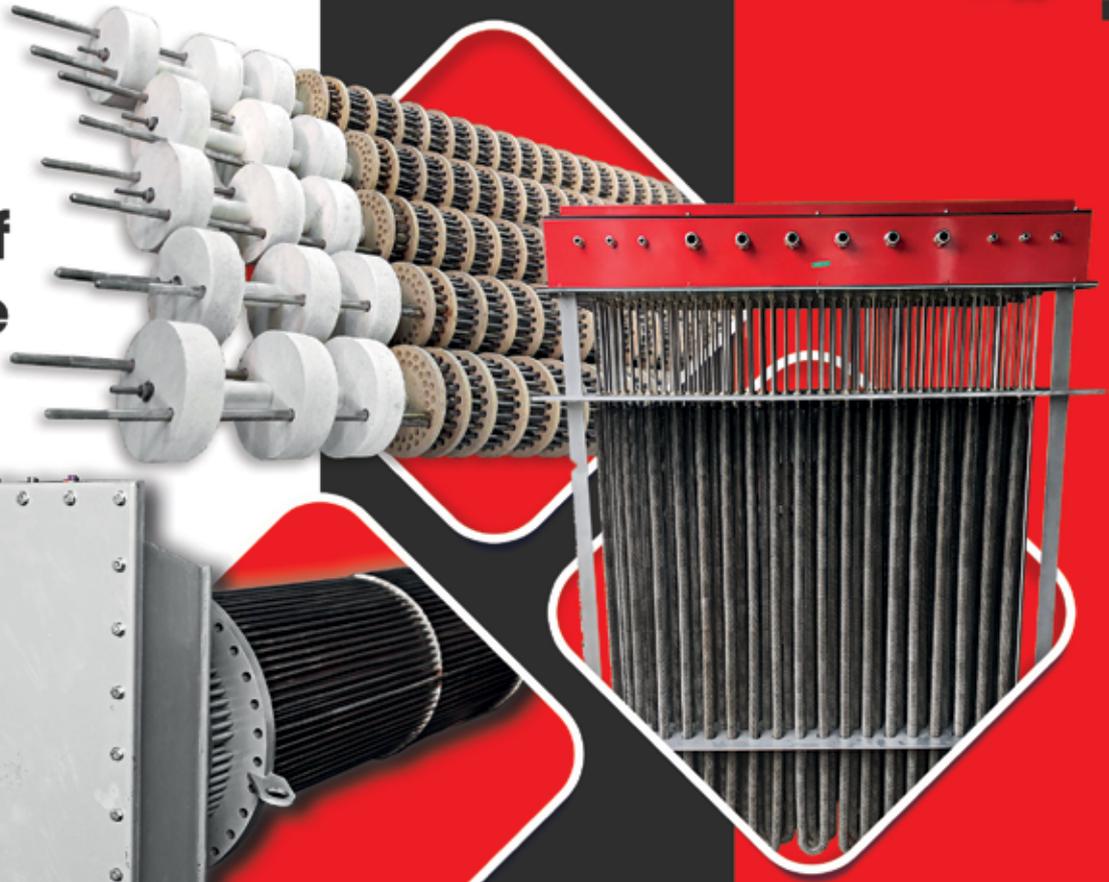


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+ 50 Years of Experience



+ Turkey's First And Only Atex Certified Exproof Heater Manufacturer

ENGINEERING SOLUTION IN ELECTRICAL HEATING

We continue to serve our customers with the principles of customer satisfaction-oriented work and on-time delivery of all our high-quality products, of which we are manufacturers and importers.

ABOUT US

Industrial Heating Elements Most Preferred Producer of Turkey

Since 1970, Baykal Rezistans is serving unlimited and excellent services to his customers. Now, our company is just producing industrial heating element for his special customers.

Baykal Rezistans presents high level engineering services to approximately ten thousand customers all around the world, with boutique and customer based exclusive service philosophy.

Baykal Rezistans, which has become an international trade and representation company by being the representative, distributor and authorized dealer of many European companies, besides the production realized, offers the imported materials to the market by evaluating it in its own production process.

It continues to serve its customers with all its high quality products, of which it is a manufacturer and importer, with customer satisfaction-oriented studies and on time delivery principles.

As Baykal Rezistans, we are the pioneer and only company in Turkey in the production of Atex-certified heating elements. Exproof Heating Elements can be used for a wide variety of purposes. It is used safely in the chemical and petrochemical industry, in industrial processes, oil platforms, military facilities and many other places, in areas where an explosive atmosphere may occur, in environments where substances are stored, processed or produced.