



# **SISTEM TEKNİK**

## **INDUSTRIAL FURNACES**



Solutions for  
**HEAT TREATMENT**  
**REQUIREMENTS**



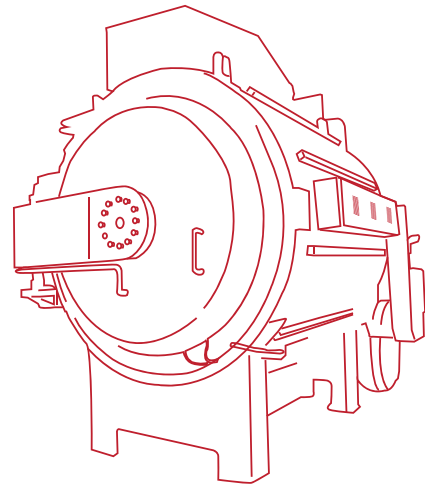




**Mehmet ÖZDEŞLİK**  
CEO

Sistem Teknik Industrial Furnaces was established in 1979. Since the day we established, providing solutions to our customers for their heat treatment requirements. We are proud of delivering our technology to all around the world with our experienced and successful staff. Besides our standard furnaces, special solutions for our customers carry us every time one step further.

Sistem Teknik devotes itself for 100% customer satisfaction with 10000 m<sup>2</sup> production hall, test abilities before delivery, heat treatment center for R&D activities, high level experienced more than 100 designs, production and after sales service staff. ■







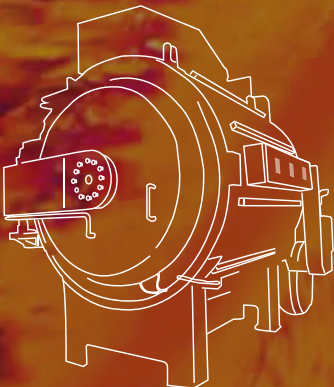
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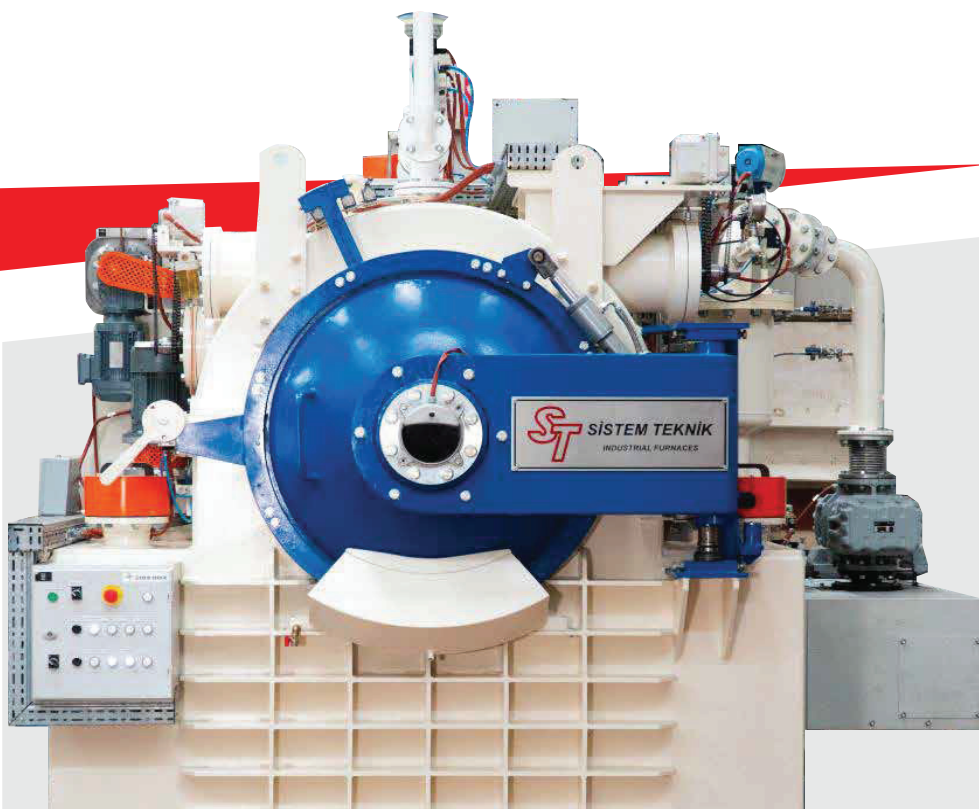


# Vacuum Furnaces

Vacuum furnaces are used in different sectors, especially in aviation, defense, aerospace, mold industry, automotive, white goods industry and medical, for general heat treatments, mold heat treatments, surface hardening applications, special processes of non-ferrous metals, brazing and many other processes.

Sistem Teknik AŞ offers solutions for your vacuum heat treatment needs for different heating with standard and special furnaces alternatives, especially graphite, molybdenum, tungsten, with vacuum options from  $10^{-1}$  bar to  $10^{-8}$  bar, process temperatures between  $200^{\circ}\text{C}$  and  $2200^{\circ}\text{C}$  and cooling pressure up to 20 bar .

- Graphite heated vertical and horizontal loading vacuum gas quench furnaces
- All-metal vertical and horizontal loading vacuum gas quench furnaces
- Vertical and horizontal loading all metal heat treatment furnaces for aerospace, defense and aerospace industries
- Vacuum oil quench furnaces
- Vacuum temper furnaces
- Vacuum nitration furnaces
- Low Pressure Carburising (LPC) Furnaces
- VIM - Vacuum Induction Melting
- ALL IN ONE - Vacuum Heat Treatment Furnaces (Gas Quench, Oil Quench, LPC, cementation, tempering)
- Special Designed Vacuum Heat Treatment Furnaces



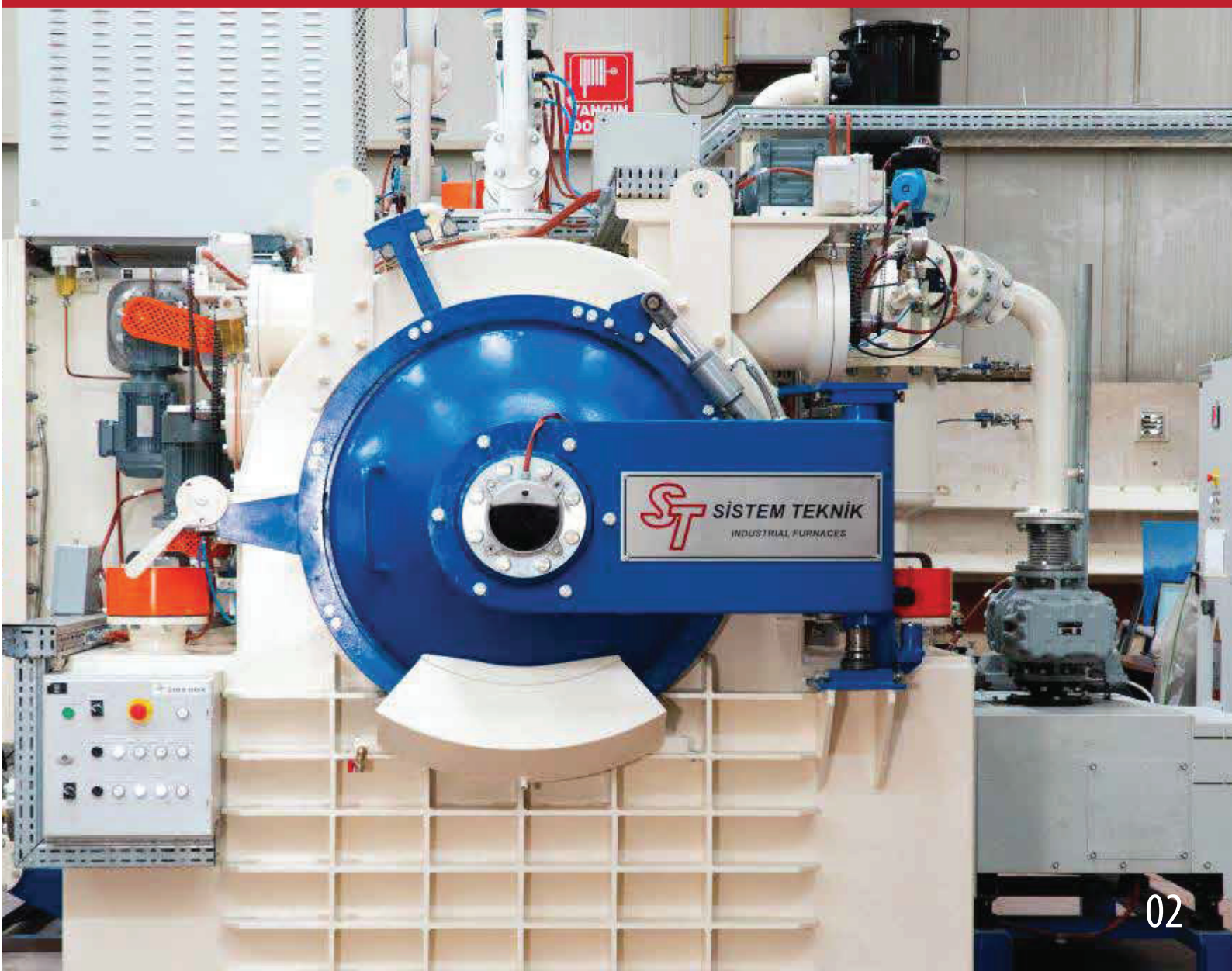
**ALL  
IN  
ONE**

# No Need for More Furnaces From Now On: **ALL IN ONE**

With Sistem Teknik AIO series vacuum heat treatment furnaces, your different heat treatments are now in a single oven!

The AIO series, which provides an ideal solution for businesses that apply more than one heat treatment process, produces solutions for all your heat treatment needs with a single furnace investment.

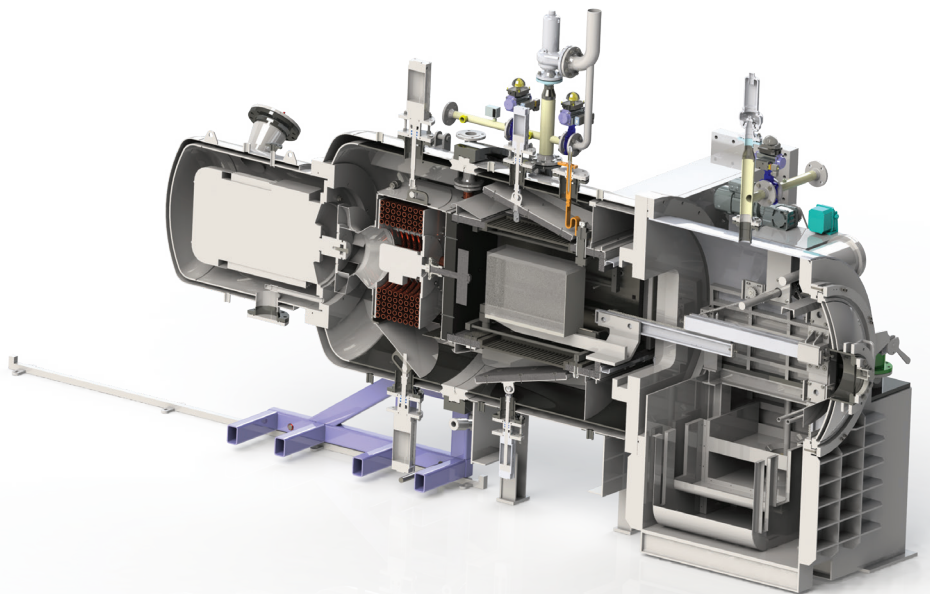
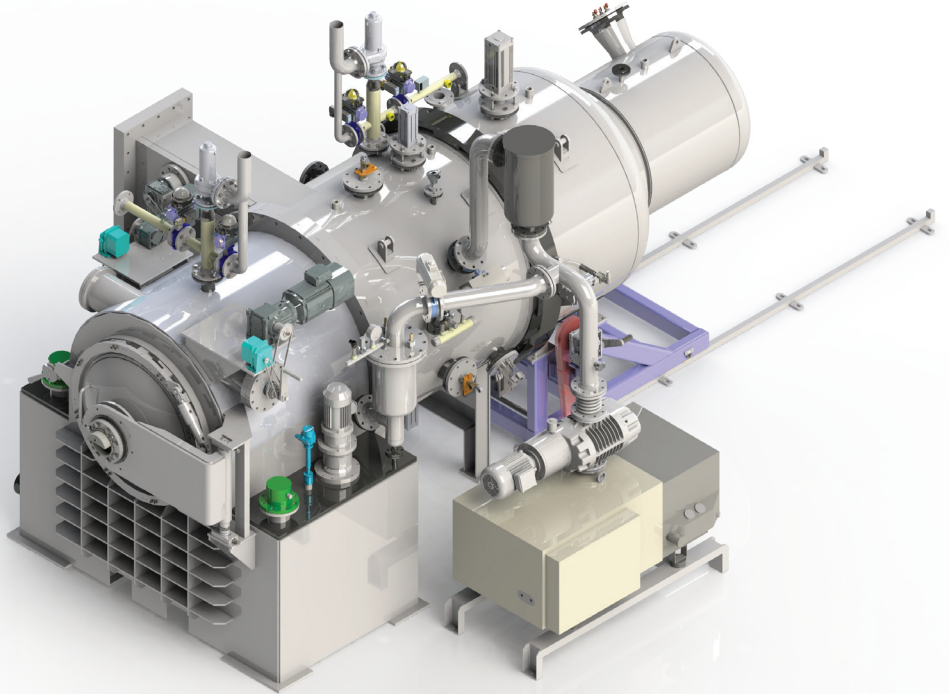
- Vacuum Gas Quench
- Vacuum Oil Quench
- Low Pressure Carburising (LPC)
- Cementation
- Tempering





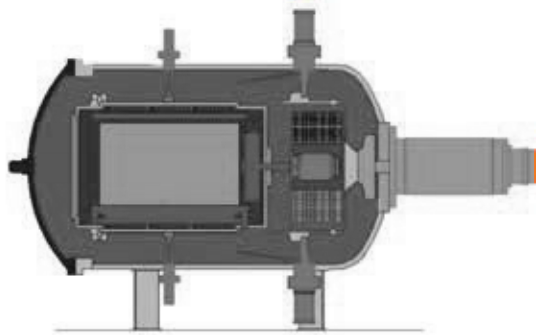
All in One

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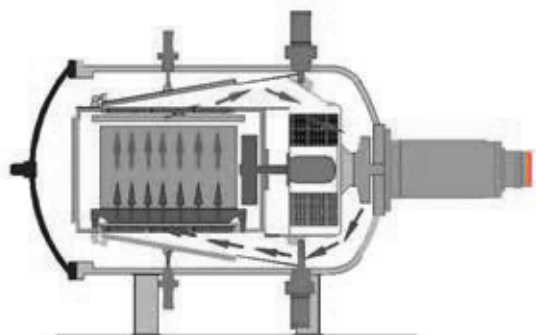




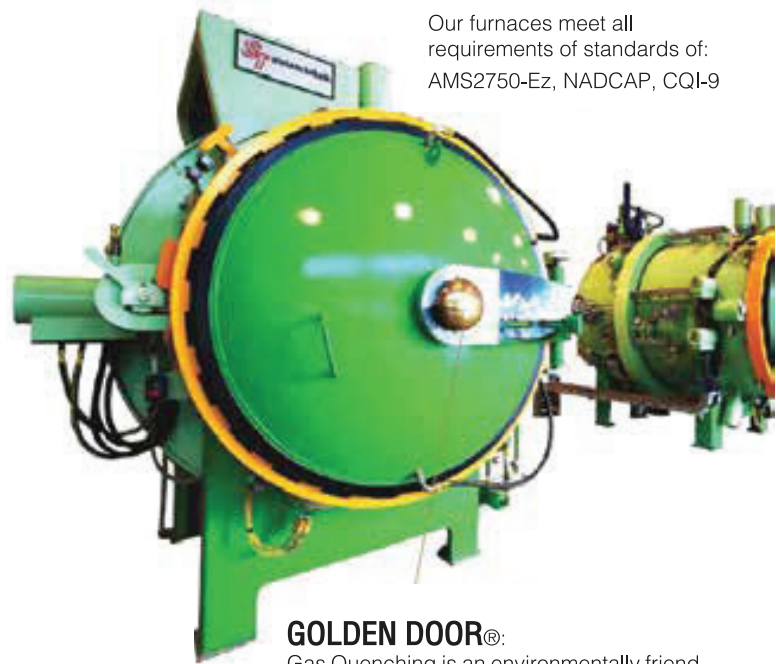
# Gas Quench Furnaces



Heating step



Cooling Step - Vertical Cooling



Our furnaces meet all requirements of standards of: AMS2750-Ez, NADCAP, CQI-9

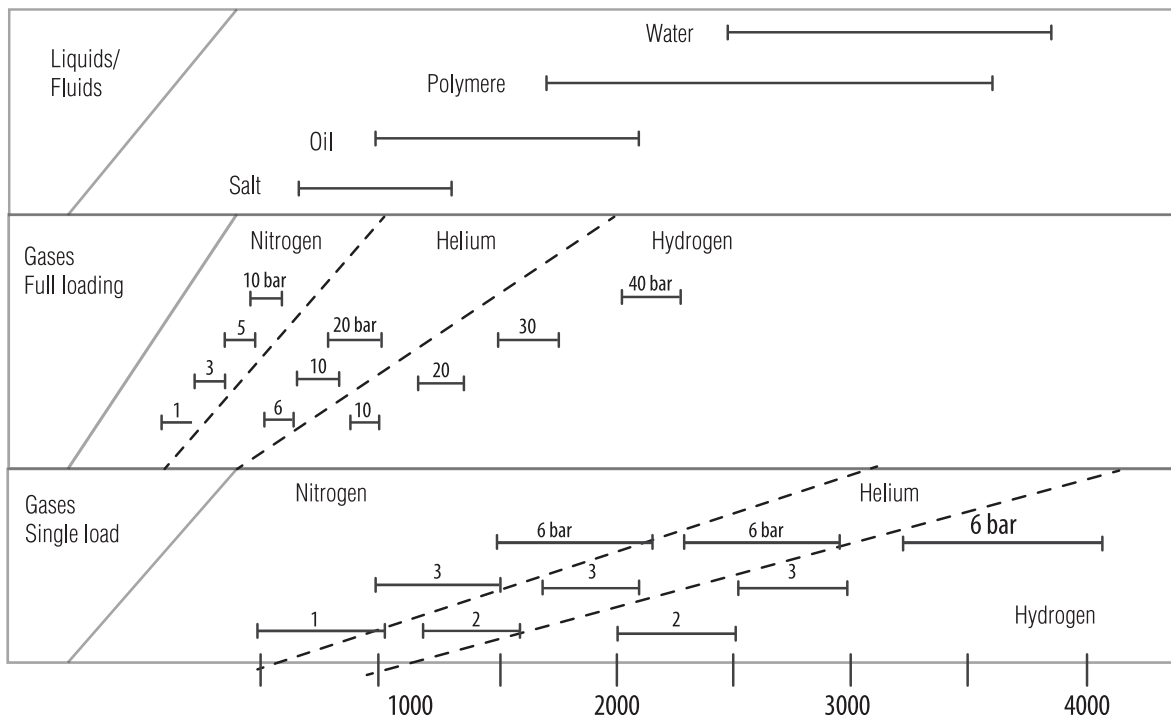
## **GOLDEN DOOR®:**

Gas Quenching is an environmentally friendly, low-distortion technique. Hydrogen is the cheapest and most effective gas for this application and it's possible to design out the risk of using a flammable gas.

TYPE	Useful Dimensions	Useful Volume(dm3)	Charge Weight (kg)	Heating Power kW
VF-2D-A-333	300x300x300	27	50	45
VF-2D-A-353	300x500x300	45	80	50
VF-2D-A-464	400x600x400	96	200	72
VF-2D-A-696	600x900x600	324	1000	140
VF-2D-A-9129	900x1200x900	972	1500	180
VF-2D-A-101510	1000x1500x1000	1500	1750	200

- High efficiency molybdenum - graphite heating option
- 200 - 1430 °C process temperature range suitable for different processes and heat treatments
- Gas cooling up to 20 bar for your special heat treatment
- Nitrogen - argon - helium cooling option specific to your infrastructure and process
- Partial pressure control
- Don't worry about the vacuum value: -10<sup>-1</sup> mbar - 10<sup>-6</sup> mbar Vacuum

# Vacuum Furnaces



Heat Transfer Coefficient (W/m²K)  
Comparison of different cooling media

# Vacuum Furnaces for Aviation Industry

AMS  
2750  
CLASS -1



# Vacuum Furnaces for Aviation Industry



# Vacuum Tempering Furnaces

■ **Sistem Teknik Direct Heated Vacuum Tempering Furnace is a vacuum furnace that is designed to provide excellent temperature uniformity, rapid heating and rapid cooling performance in a single chamber design.**



After hardening in a vacuum furnace the parts are metallic bright and clean. In order to keep the same surface quality after tempering process, tempering furnace needs to have capability to ensure needed conditions for the surface quality.

Therefore in such cases for the tempering process a vacuum tempering furnaces with direct heating type DC of the latest generation is recommended in order to prevent oxidation of the component surface reliably.



Deeper vacuum levels give more flexibility for different heat treatment applications like aging of aircraft engine parts.

The furnace can process a wide range of materials for aging, annealing, stress relieving and tempering, in single or multiple step program mable cycles.

The cold Wall Shell does not discharge heat into the room while ensuring vacuum integrity.

## ■ VF-TE-DC SERIES VACUUM TEMPERING FURNACE, TECHNICAL DATA

Model Number	Useful Dimensions ( mm )	Load Weight (kg - gross)	Heating Power (kWh)
VF-T-E-DC-696	600x900x600	1000	140
VF-T-E-DC-9129	900x1200x900	1500	220
VF-T-E-DC-101510	1000x1500x1000	2000	260

### Heating Chamber

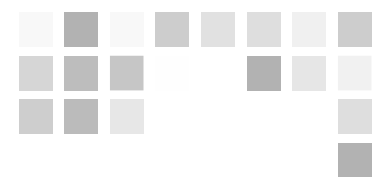
Heating chamber is constructed of high density ceramic fiber insulation captured between stainless steel shielding plates and steel outer frame, stainless steel load support and cooling flaps (on circulation fan and front door) actuated by pneumatic cylinders depending on the heating and cooling phase.

### Heating Elements

Wide band Inconel heating elements are mounted on the inner cylindrical Wall of the heating chamber in 360° arrangement. The elements are supported by ceramic insulators and constructed of heavy Cross section material yielding long life. The mounting method allows for superior heat distribution to all locations within the workload.

### Cooling System & Circulation Fan

Cooling system is consisting of; A special cooling fan with water cooled motor, high capacity internal heat exchanger made of copper finntubes have excellent heat transfer capability and two cooling flaps actuated by pneumatic cylinders. After evacuation furnace is pressurized (standard 1200mbar, optional 1.5 or 2 bar abs.) with inert gas, fan circulates inert atmosphere (N2 and optipnal N2+H2, Ar, He) throughout the workload during both the heating and cooling cycles. It is the combination of radiant and convective heat transfer to the work pieces that provides excellent uniformity. When the new generation cold wall tempering furnaces are compared with the hot wall retort furnaces, energy consumption is 25-30% less than hot wall furnaces. Furthermore, because of direct heating and direct cooling, total process time is shorter and efficiency is higher than the conventional type furnaces.



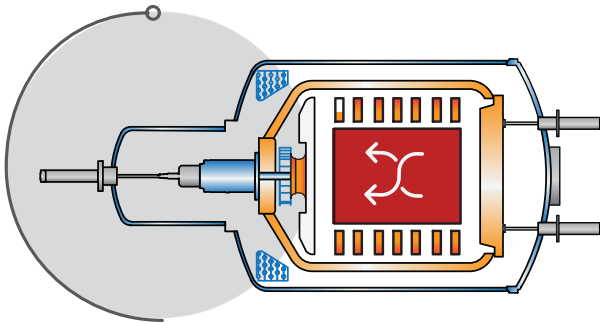
**STRONG RESEARCH AND DEVELOPMENT**

**EFFECTIVE SERVICES**





## Heating Cycle



LOWER ENERGY CONSUMPTION  
25-30% SAVING

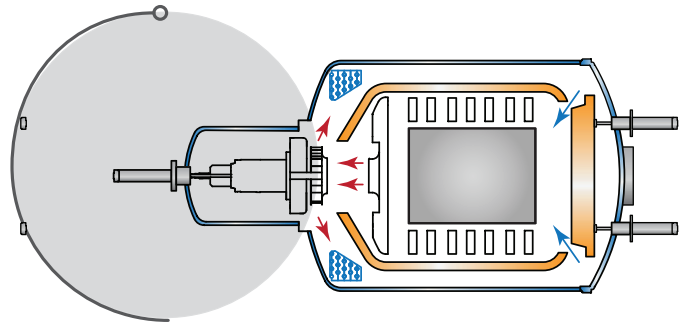


SHORTER CYCLE TIMES



HIGH PRODUCTION EFFICIENCY WITH LOW MAINTENANCE NEEDS

## Cooling Cycle



EXCELLENT TEMPERATURE HOMOGENEITY

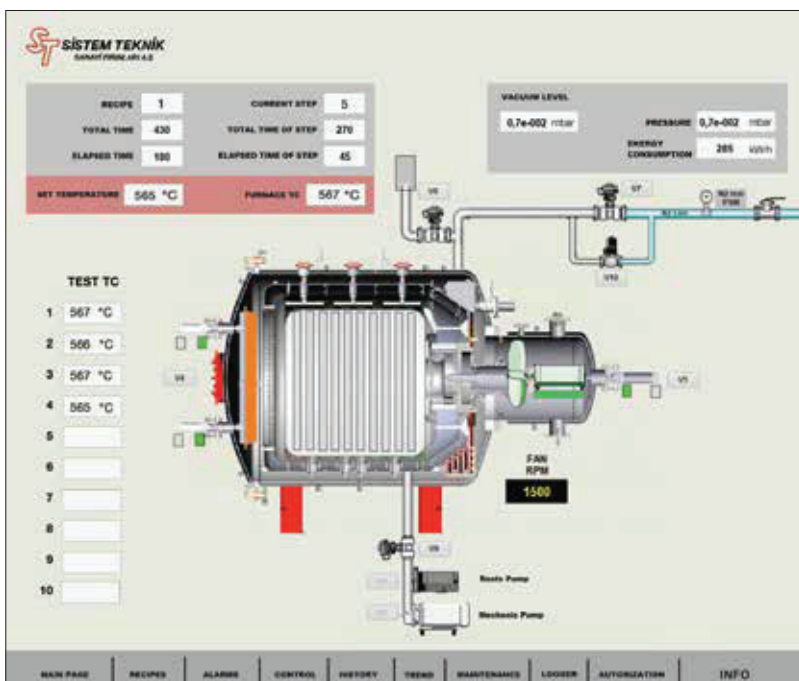


BRIGHT SURFACES

## CONTROL SYSTEM

- Archiving of measured process parameters as well as recording information processed detail save in the database
- Documenting process in accordance with system requirements to ensure quality
- Visualization of the technological process

- Functionality and easy service availability
- Integrated management
- Easy and user friendly interface
- Providing full integration with software SCADA (Supervisory Control and Data Acquisition) and no need for additional software
- Remote access to the SCADA system
- Control management as required by NADCAP standards
- System Accuracy Test (SAT) Integration
- Thermo-elements operation time counters
- Temperature Uniformity Survey (TUS) and TUS reporting



# Benefits of Vacuum Furnaces



SURFACE  
QUALITY

## BETTER SURFACE QUALITY

- ✓ Better vacuum levels for better surface quality, real vacuum application

## PERFORMING APPLICATIONS

- ✓ Capability of performing different heat treatment processes



FAST  
COOLING

## ENERGY CONSUMPTION

- ✓ Shorter cycle times and lower energy consumption (convection heating & fast cooling)

## EFFECTIVE

- ✓ Internal cooling system for effective and fast cooling



COMPACT  
DESIGN

## COMPACT DESIGN

- ✓ Less maintenance need and lower spare part costs, compact design

## DEEPER VACUUM LEVELS

- ✓ Possibility to have vacuum levels starting from  $10^{-2}$  mbar and deeper vacuum levels for operation

## NADCAP

- ✓ Operating according to Nadcap and AMS 2750D/2750E requirements optional depends on request

## PROCESS FLEXIBILITY

- ✓ Performing different applications, like tempering, stress relieving, aging, annealing, quenching, brazing etc. for different type of materials without discoloration



LONG LIFE  
TIME

## LIFE TIME

- ✓ Long life time and to have reproducible results

## USER FRIENDLY

- ✓ User friendly operation

## FAST COOLING FEATURE

- ✓ Heating-up and cooling down the both small and heavy loads rapidly with fast heating and fast cooling feature

## PERFORMING THE PROCESS CYCLES

- ✓ Performing the process cycles using both furnace and load thermocouples



PRODUCT  
PERFORMANCE

## COLD WALL DESIGN

- ✓ Minimum energy waste by low surface losses, excellent insulation and cold wall design

## LOW MAINTENANCE COST

- ✓ Performing the convection heating and cooling cycle with the same moving fan, means effective heating, effective cooling and low maintenance cost

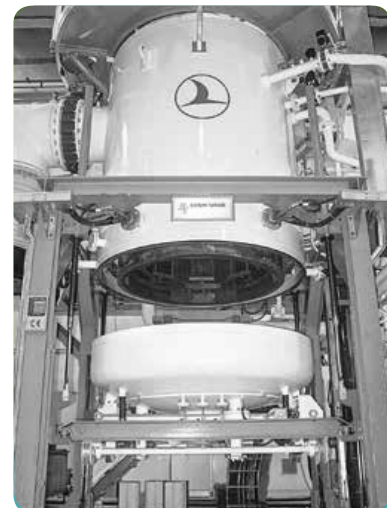
# Special Vacuum Furnaces



Tubitak  
6<sup>th</sup> Technology  
Achievement  
Award

**With many types of  
Vacuum Furnaces:**

- High Temperature Vacuum Furnaces
- Vacuum Induction Melting Furnaces (VIM)
- Metal Injection Molding Furnaces (MIM)
- Custom Designed Vacuum Furnaces
- Vacuum Nitriding Furnaces





# After Sales & Spare Parts

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Sistem Teknik A.S. is a leading company for entire Europe with its competent and strong staff.

## Our Services

- 7/24 Technical Service
- Annual Maintenance
- Spare Part Delivery
- Furnace Modernization
- Furnace Refurbishing and Installation
- Burner Adjustment
- TUS Test
- SAT Test
- Vacuum Leakage Test
- Chimney Gas Analysis

Sistem Teknik provides your spare part requirements which are in accordance with EN, DIN, ISO 9001 standards in shortest time.

Besides the best quality of heat treatment equipment, we take care of your continuity of production. Sistem Teknik family provides a complete service, not just the technology. Our AFTER SALES SERVICE is 24/ available.

After Sales Service and Spare Parts

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Over  
**40**

Years of

**EXPERIENCE**

# **ST** *SİSTEM TEKNİK*

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