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 standart furnaces, special solutions for our customers carry us every time one step further. Sistem Teknik devotes itself for 100% customer satisfaction with 7000 m² production hall, test abilities before delivery, heat treatment shop for R&D activities, high level experienced 80 design, production and after sales service staff.

**ABOUT US**

**BATCH TYPE FURNACES**
- VACUUM FURNACES-
- SEALED QUENCH FURNACES-
- BELL TYPE FURNACES-
- PIT TYPE FURNACES-
- BOGIE HEARTH FURNACES-
- FIRE RESISTANCE TEST FURNACES-
- DRYING OVEN AND AUTOCLAVES-

**CONTINUOUS FURNACES**
- MESH BELT FURNACES-
- CHAIN CONVEYOR FURNACES-
- ROLLER HEARTH FURNACES-
- ROTARY KILNS-
- CAST LINK BELT FURNACES-
- ROTARY HEARTH FURNACES-
- WALKING BEAM TYPE FURNACES-
- PUSHER TYPE FURNACES-

**AUXILARY EQUIPMENT**
- LOADING&UNLOADING SYSTEMS-
- QUENCH SYSTEMS-
- RECIPIERATORS FOR ENERGY SAVING-
- TRANSFER CONVEYORS & MANIPULATORS-

**ATMOSPHERE GENERATORS**
- EXOGAS GENERATORS-
- ENDOGAS GENERATORS-
- MONOGAS GENERATORS-
- AMMONIA CRACKER-
- GAS MIXING SYSTEMS-
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.
VACUUM TECHNOLOGY

Bottom Loader All Metal Vacuum Furnace

Bottom Loader Brazing Furnace

Vacuum Nitriding and Tempering Furnace

Horizontal Type Vacuum Gas Quenching Furnace

<table>
<thead>
<tr>
<th>TYPE</th>
<th>Useful Dimensions WxLxH (mm)</th>
<th>Useful Volume dm³</th>
<th>Loadweigh (kg)</th>
<th>Heating Power kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>VF-2D-A-333</td>
<td>300x300x3002</td>
<td>7</td>
<td>50</td>
<td>45</td>
</tr>
<tr>
<td>VF-2D-A-353</td>
<td>300x500x3004</td>
<td>0</td>
<td>80</td>
<td>50</td>
</tr>
<tr>
<td>VF-2D-A-464</td>
<td>400x600x4009</td>
<td>6</td>
<td>200</td>
<td>72</td>
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<tr>
<td>VF-2D-A-664</td>
<td>600x600x400</td>
<td>144</td>
<td>300</td>
<td>100</td>
</tr>
<tr>
<td>VF-2D-A-696</td>
<td>600x900x600</td>
<td>324</td>
<td>600</td>
<td>140</td>
</tr>
<tr>
<td>VF-2D-A-996</td>
<td>900x900x600</td>
<td>486</td>
<td>750</td>
<td>180</td>
</tr>
<tr>
<td>VF-2D-A-8128</td>
<td>800x1200x800</td>
<td>768</td>
<td>800</td>
<td>180</td>
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<tr>
<td>VF-2D-A-9127</td>
<td>900x1200x700</td>
<td>756</td>
<td>800</td>
<td>180</td>
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<tr>
<td>VF-2D-A-101510</td>
<td>1000x1500x1000</td>
<td>1500</td>
<td>1000</td>
<td>240</td>
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<tr>
<td>VF-2D-A-121510</td>
<td>1200x1500x950</td>
<td>1710</td>
<td>2000</td>
<td>280</td>
</tr>
<tr>
<td>VF-2D-A-102012</td>
<td>1000x2000x1200</td>
<td>2400</td>
<td>2500</td>
<td>300</td>
</tr>
</tbody>
</table>
Roller Hearth Furnaces are ideal for heat treatment of bars, tubes and forged parts to improve physical properties.

- High efficiency with gas or electrically heating
- Indirect heating for protective atmosphere
- Flexible production capabilities with load tracking system & level II automation
- Heavy duty rollers with high grade materials for long service life
- Oxygen Control for very low decarburization
- Fast loading & unloading system

**Processes:**
- Annealing
- Isothermal Annealing
- Bright Annealing
- Normalizing
- Quenching and Tempering
- Stress Relieving
- Reheating For Rolling
- Spheroidising
ROLLER HEARTH FURNACES

Self Recuperative Heating

Automatic Lubrication

Refactory Lining

Level II Automation and Tracking System
WALKING BEAM TYPE FURNACES

- Hydraulic or mechanic actuated walking beam system
- Excellent temperature homogeneity
- Automatic loading/unloading
- Reliable and long service life
- Temperature up to 1250°C
- Low energy consumption by special design recuperator
- Oxygen control system

Main industries:
- Leaf spring production
- Heavy coil spring production
- Stabilizer bar production
- CNG cylinder production
- Billet and slab rolling mill
Gas or electrically heated

Direct or indirect heating

Moduler design for flexibility and easy transportation

Self or central recuperative combustion system and pressure control in the furnace for high energy efficiency

Heavy duty pneumatically operated lifting seal trough frame located on the car to prevent air infiltration. Pneumatic clamps ensure tight seal of the door to furnace casing

Options:

- Pre-heated combustion air up to 450°C
- Oxygen control for low oxidation and decarburization
- Automatic water or oil quenching
- Protective atmosphere

Temperature range: 100 ° - 1250 °C
Capacity: 2-200 ton

Processes:
- Hardening
- Annealing
- Soft Annealing
- Normalizing
- Stress Relieving
- Tempering
- Reheating
- Curing
Our GKF series Sealed Quench Chamber Type Furnaces are used for various treatments such as case hardening, carbonitriding hardening, normalizing, carburizing and annealing with quenching in oil, or salt under protective atmosphere with different versions to meet your requirements.

Frontal loading/unloading or backside loading configurations are available.

These plants can be coupled with pre-heating furnaces, washing machine, tempering furnace, loading/unloading tables and automatic charging car.

<table>
<thead>
<tr>
<th>TYPE</th>
<th>GKF-250</th>
<th>GKF-400</th>
<th>GKF-600 (Quench Tank)</th>
<th>GKF-1000</th>
<th>GKF-1500</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HEATING ZONE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>800-960 °C (Max. 1000 °C)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heating Type</td>
<td></td>
<td></td>
<td>Gas or Electrically</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heating Power</td>
<td>50 kW</td>
<td>72 kW</td>
<td>140 kW</td>
<td>150 kW</td>
<td>190 kW</td>
</tr>
<tr>
<td>Useful Dimensions (mm)</td>
<td>400x600x300</td>
<td>610x910x460</td>
<td>760x1220x760</td>
<td>910x1120x760</td>
<td>1270x1570x760</td>
</tr>
<tr>
<td>Charging Capacity</td>
<td>250 kg</td>
<td>400 kg</td>
<td>600 kg</td>
<td>1000 kg</td>
<td>1500 kg</td>
</tr>
<tr>
<td><strong>QUENCHING OIL TANK</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Working Temperature</td>
<td>60-150 °C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heating Power</td>
<td>20 kW</td>
<td>24 kW</td>
<td>30 kW</td>
<td>48 kW</td>
<td>60 kW</td>
</tr>
<tr>
<td>Oil Volume</td>
<td>2600 L</td>
<td>4200 L</td>
<td>5300 L</td>
<td>8900 L</td>
<td>13500 L</td>
</tr>
</tbody>
</table>

Salt quench is available as optional.
Our pusher type furnaces are used for hardening, isothermal annealing, normalizing, carburizing or grain-oriented silicon steel annealing.

**Processes:**
- Normalizing
- Hardening
- Annealing
- Stress Relieving
- ISO Thermal Annealing
CONTINUOUS HEAT TREATMENT LINES

- Sistem Teknik CL series heat treatment lines are designed for carburizing, carbonitriding, annealing, hardening and tempering of the fasteners, forgings and machined parts.

- In these lines, the magnetic loading system eliminates the stretch of sensitive parts during loading with vibration feeder.

- Mesh belt or Cast link belt conveying choice gives the possibility of heat treating wide range of parts in these lines.

- For cast link belt model, two flaps at the inlet of the hardening and carburizing furnace completely isolate the furnace atmosphere from the outside, reduce the energy and atmosphere gases consumption.

- Heating of the both hardening and tempering furnaces are performed with either gas or electricity via radiant tubes.

- Low NOX burners, equipped with high efficiency recuperators.

- Endothermic gas or nitrogen-methanol system option for furnace atmosphere.

- Polymer, oil or hot salt bath options for quenching bath.

- Good temperature and atmosphere uniformity with powerful circulation fans in both hardening and tempering furnaces.

- Selectable soluble oil or black oxide tank after the tempering furnace gives high corrosion resistance to treated parts.

Mainly used for;
- Fasteners
- Small castings
- Forgings
- Precision components

Processes;
- Carburising
- Carbonitriding
- Annealing
- Hardening
- Tempering
Sistem Teknik offers a custom design atmosphere controlled continuous brazing furnace since many years with his decades experience.

**Features:**
- Available in a variety of sizes and belt widths
- Unique temperature uniformity
- High quality furnace atmosphere with low gas consumption.
- Light weight and compact design
- Low maintenance cost
- Remote access to control system
- Working under safety conditions
- Long service life

<table>
<thead>
<tr>
<th>Features</th>
<th>Mild Steel, Stainless Steel (Cooper and Silver Brazing)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Useful Width</td>
<td>up to 1350 mm</td>
</tr>
<tr>
<td>Useful Height</td>
<td>up to 350 mm</td>
</tr>
<tr>
<td>Length of Line</td>
<td>up to 40000 mm</td>
</tr>
<tr>
<td>Heating Type</td>
<td>Electrically or Gas</td>
</tr>
<tr>
<td>Temperatures</td>
<td>550°C - 1150°C</td>
</tr>
<tr>
<td>Atmosphere Type</td>
<td>Endogas, Exogas or Hydrogen / Nitrogen Mix</td>
</tr>
<tr>
<td>General Design</td>
<td>Humpback or Straight</td>
</tr>
<tr>
<td>Hot Zone Type</td>
<td>Muffle or non Muffle</td>
</tr>
<tr>
<td>Cooling Type</td>
<td>With Water Circulation in Stainless Steel Jacket</td>
</tr>
</tbody>
</table>

**Processes:**
- Brazing
- Sintering
- Tempering
- Bright or Extra Bright Annealing
Fire resistance testing furnaces have been developed mainly to satisfy the needs of authorized test laboratories when they verify test and prove the fire rating mainly of;

YTF series Fire Resistance Test Furnaces are used to determine the resistance of the building components to the fire.

**Thanks to our modular design**

We have special modular design for fire test furnaces that all furnace is constructed with standard modules.

With this design it is possible to make 4m x 4m standard furnaces which are adaptable up to 8m x 8m sizes to make the tests of big size specimens like special doors or big tunnel sections.

- Fire doors and shutters
- Load bearing and non-load bearing elements
- Walls
- Ventilation ducts
- Columns
- Cable barriers
- Partitions and glazed screens
- Dampers
- Ceiling, decks, and bulk heads of ships
- Penetration seals
- Linear joint seals
- Aviation parts
- Tunnels

**Flexy Grand Combi Furnace**

*Flexy technology is developed by Efectis to fulfill all requirements of fire resistance test without limitation of sizes.*
Our furnaces meet the requirements of the standards: EN 1363-1, EN 1363-2.

*Our furnaces are fully capable of testing vertical and horizontal test specimens with:*

- Normal curve
- Slow heating curve
- Hydro-carbon curve (HCM)
- Modified Hydro-carbon curve (HCM)
- Rijkswaterstaat curve (RWS)
- Any other curves up to 1350°C
Drying Ovens and Autoclaves for Transformers

These type of furnaces are manufactured in order to make drying of transformers under vacuum by bogie hearth loading mechanism. We are manufacturing drying furnaces for transformers according to required capacity and dimensions of customer’s site.

General Features:
- Heating under air or protective atmosphere with forced convection
- Drying under vacuum down to $10^{-3}$ mbar range.
- Heating with hot water, steam or electric heating elements
- Capacity: 1-100 tonnes
- High temperature uniformity

Options:
- Positive pressure up to 10 bar
- Compliance of AMS 2750E
- Oil filling process for transformers

Carbon Regeneration Kilns

Carbon regeneration system is a thermal regeneration of activated carbon for reuse for filtering of various liquid materials.

CR series Regeneration kilns are used for:
- Chemical, dry cleaning, oil recovery
- Food & beverage industry
- Water & wastewater treatment,
- Mineral processing

Sistem Teknik
Regeneration Furnaces Have

- Thermal Efficiency
- Low Consumption
- User Friendly System
- Maintainability / Reliability
- Minimal Utility Requirements
- Excellent Regeneration
- Ongoing Support
- Clean Process with Gas Scrubber System
- Self Incineration of Flue Gasses
Pit & Bell Type furnaces are mostly used for:

- Normalizing,
- Quenching and tempering,
- Stress relieving,
- Nitriding
- Carburizing,
- Spheroidizing of different types of products and materials.

**Customer requirements for the process results are:**

- No oxidation
- No decarburization
- Good mechanical results
- Short cycle time
- Low energy consumption

The processes can be performed under nitrogen, but with hydrogen the technical and commercial results are even better due to the outstanding physical properties of hydrogen.

**Pit Type Furnaces**

For heat treatment of coils of strip, long shafts, tubes, wire and rods in medium size loads.

**Heating:**
Heating with convection up to 850°C
Heating with radiation up to 1150°C

**Cooling:**
Cooling with indirect air cooling in cooling pits

**Quenching:**
Quenching in water, oil, salt bath or fluidized bed, by extracting the load out of the retort, and transferring it to the quenchbath.

- Charge Capacity: 10 tons - 100 tons
- N² & H² furnace atmosphere
- Gas or electrically heating
- Redundant sensors and valves for maximum safety
- Max. efficiency with recuperative system and high convection heat transfer in the furnace.
LEAF SPRING MANUFACTURING FURNACES

End Heating Furnace for Eye Forming

General Features:

- Chain or Palette Conveyor
- Gas or Induction Heating
- Manual, Manipulator, Robotic Loading & Unloading
- Low Energy Consumption with Large turn-down ratio
- Low Decarburization with precise control of gas/air ratio

Parabolic Taper Rolling Furnaces

General Features:

- Walking beam conveyor
- Gas or Induction Heating
- Manual, manipulator, Robotic Loading & Unloading
- Low energy consumption with radiation barrier
- Low decarburization with precise control of gas/air ratio
- Pre-cast modules for easy and fast repairing of insulation

Heat Treatment Lines

General Features:

- Capacity: 1-7 tons/hour
- Heating: Gas or diesel
- Energy consumption: 65 m³/ton NG approx.
- Decarburization: No total decarburization, less than 50
- Micron partial decarburization for Cr-V spring steel
- Full fills all the requirements of CQI-9
AFTER SALES AND SPARE PARTS

NOBODY CAN UNDERSTAND YOU BETTER!

Besides the best quality of heat treatment we take care of your continuously production. Sistem Teknik family provides a complete service, not just the technology. Our After Sales Service is 24/7 reachable.

FOR YOUR SPARE PART NEEDS...

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

CHECK UP

★ We have to be sure about health of your process.
★ Productive Maintenance
★ Leak Detection Test
★ Temperature Homogenity Test.

★ Maxon Servicing

★ Contacts:

www.sistemteknikfirin.com

service@sistemteknik.com

Tel : +90 262 658 29 14
Mob : +90 544 640 23 41
Mob : +90 533 638 69 81
Our furnaces successfully comply with all or some of the standards seen below;

CE – Conformité Européenne

EN ISO – European Norms - International Organisation for Standardization

SAE-AMS – The Society of Automotive Engineers / Aerospace Material Specifications
AMS 2750 / AMS 2759-1E / AMS 2769 B / AMS 2774 C

CQI 9 Heat Treatment Standard for Automotive Sector

IEC– International Electrotechnical Commission
IEC - 584

AMS 2750 Instrumentation & Classification Chart for Industrial Furnaces

<table>
<thead>
<tr>
<th>Instrumentation</th>
<th>Type</th>
<th>Furnace Class</th>
<th>Temperature Uniformity (°C)</th>
<th>Temperature Uniformity (°F)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>Each control zone has a thermocouple connect to the controller</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Recording of the temperature measured by the control thermocouple</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Sensors for recording coolest and hottest spots</td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Each control zone has a charge thermocouple with recording system</td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Each control zone has an over-temperature protection unit</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

Carburising & Nitriding Processes and Used Gases

<table>
<thead>
<tr>
<th>Process</th>
<th>Temperature (°C)</th>
<th>Typical Process Time</th>
<th>Element Transferred</th>
<th>Case Depth (mm)</th>
<th>Surfaces Hardness (HV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carburising</td>
<td>850 - 950</td>
<td>4-10 h</td>
<td>C</td>
<td>0.2 - 1.5</td>
<td>750 - 850</td>
</tr>
<tr>
<td>Carbonitriding</td>
<td>750 - 900</td>
<td>2-5 h</td>
<td>C+N</td>
<td>0.1 - 0.8</td>
<td>750 - 850</td>
</tr>
<tr>
<td>Austenitic Nitrocarburising</td>
<td>600 - 700</td>
<td>2-4 h</td>
<td>N+C</td>
<td>0.1 - 0.5</td>
<td>750 - 850</td>
</tr>
<tr>
<td>Nitrocarburising</td>
<td>560 - 580</td>
<td>2-4 h</td>
<td>N+C</td>
<td>0.05 - 0.2</td>
<td>450 - 1200</td>
</tr>
<tr>
<td>Nitriding</td>
<td>500 - 510</td>
<td>5-100 h</td>
<td>N</td>
<td>0.05 - 0.8</td>
<td>450 - 1200</td>
</tr>
</tbody>
</table>
Atmosphere constituents and their action

<table>
<thead>
<tr>
<th>Active Gases</th>
<th>Oxidizing</th>
<th>Carburizing</th>
<th>Decarburizing</th>
<th>Neutral Inert Gases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reducing</td>
<td>H₂</td>
<td>Co</td>
<td>H₂O</td>
<td>N₂</td>
</tr>
<tr>
<td>CO</td>
<td>CO₂</td>
<td>CnHm</td>
<td>CO₂</td>
<td>Ar</td>
</tr>
<tr>
<td>O₂</td>
<td></td>
<td>O₂</td>
<td></td>
<td>He</td>
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</table>

Typical atmosphere compositions

<table>
<thead>
<tr>
<th>Method</th>
<th>N₂</th>
<th>H₂</th>
<th>CO</th>
<th>CO₂</th>
<th>H₂O</th>
<th>CH₄</th>
</tr>
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<tbody>
<tr>
<td>Exogas</td>
<td>79</td>
<td>7</td>
<td>5</td>
<td>8</td>
<td>0.5</td>
<td>-</td>
</tr>
<tr>
<td>Endogas</td>
<td>40</td>
<td>40</td>
<td>20</td>
<td>0.3</td>
<td>0.7</td>
<td>-</td>
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<tr>
<td>Monogas</td>
<td>87</td>
<td>7</td>
<td>5</td>
<td>0.05</td>
<td>0.05</td>
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<tr>
<td>Cracked Ammonia</td>
<td>25</td>
<td>75</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Energy Required to Raise Steel to Given Temperature (Wh/kg)

<table>
<thead>
<tr>
<th>Temp °C</th>
<th>Low Alloy</th>
<th>High Alloy</th>
<th>Temp. °F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fe</td>
<td>C</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>6.5</td>
<td>6.7</td>
<td>7.0</td>
</tr>
<tr>
<td>200</td>
<td>20.5</td>
<td>20.9</td>
<td>21.7</td>
</tr>
<tr>
<td>300</td>
<td>35.4</td>
<td>36.2</td>
<td>37.2</td>
</tr>
<tr>
<td>400</td>
<td>51.3</td>
<td>52.3</td>
<td>53.7</td>
</tr>
<tr>
<td>500</td>
<td>68.8</td>
<td>68.8</td>
<td>70.2</td>
</tr>
<tr>
<td>600</td>
<td>88.6</td>
<td>90.2</td>
<td>92.0</td>
</tr>
<tr>
<td>700</td>
<td>110.8</td>
<td>113.0</td>
<td>114.4</td>
</tr>
<tr>
<td>800</td>
<td>137.0</td>
<td>142.2</td>
<td>153.5</td>
</tr>
<tr>
<td>900</td>
<td>157.4</td>
<td>165.5</td>
<td>170.7</td>
</tr>
<tr>
<td>1000</td>
<td>178.3</td>
<td>183.6</td>
<td>187.8</td>
</tr>
<tr>
<td>1100</td>
<td>194.7</td>
<td>202.0</td>
<td>205.4</td>
</tr>
<tr>
<td>1200</td>
<td>212.0</td>
<td>220.4</td>
<td>223.8</td>
</tr>
<tr>
<td>1300</td>
<td>230.3</td>
<td>238.9</td>
<td>242.8</td>
</tr>
</tbody>
</table>