

## ABOUT US

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 m<sup>2</sup> production hall, test abilities before delivery, heat treatment shop for R&D activities, high level experienced 80 design, production and after sales service staff.

### 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-

### AUXILARY EQUIPMENT

- LOADING&UNLOADING SYSTEMS-
- QUENCH SYSTEMS-
- RECUPERATORS FOR ENERGY SAVING-
- TRANSFER CONVEYORS & MANIPULATORS-

### 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-

### ATMOSPHERE GENERATORS

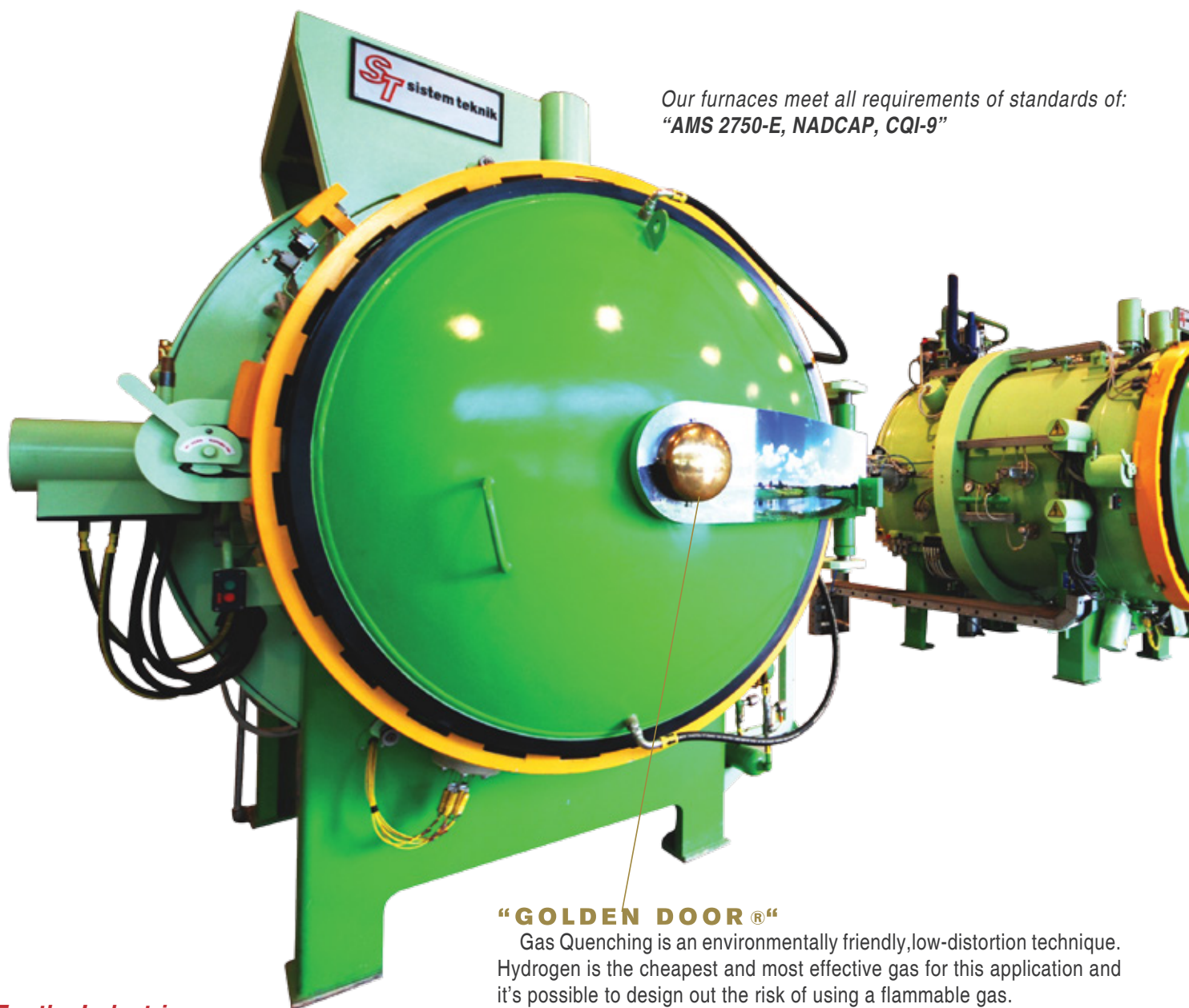
- EXOGAS GENERATORS-
- ENDOGAS GENERATORS-
- MONOGAS GENERATORS-
- AMMONIA CRACKER-
- GAS MIXING SYSTEMS-











Our furnaces meet all requirements of standards of:  
“AMS 2750-E, NADCAP, CQI-9”

### “GOLDEN DOOR”<sup>®</sup>

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.

*For the Industries;*



**Aviation**



**Defense Industry**



**Tool**



**Medical**



**Commercial Heat Treatment**



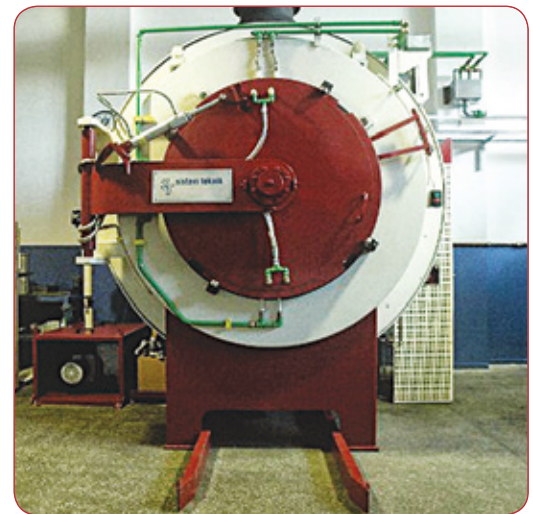
**Die and Molds**



**Bottom Loader Brazing Furnace**



**Bottom Loader All Metal Vacuum Furnace**



TYPE	Useful Dimensons WxLxH (mm)	Load- Weigh kg (gross)
VF-TE-464	400x600x400	250
VF-TE-696	600x900x600	600
VF-TE-8128	800x1200x800	1200
VF-TE-101510	1000x1500x1000	2500

**Vacuum Nitriding and Tempering Furnace**

## Horizontal Type Vacuum Gas Quenching Furnace



TYPE	Useful Dimensons WxLxH	Useful Volume dm³	Loadweigh (kg)	Heating Power kW
VF-2D-A-333	300x300x300	2	50	45
VF-2D-A-353	300x500x300	4	80	50
VF-2D-A-464	400x600x400	9	200	72
VF-2D-A-664	600x600x400	24	300	100
VF-2D-A-696	600x900x600	324	600	140
VF-2D-A-996	900x900x600	486	750	180
VF-2D-A-8128	800x1200x800	768	800	180
VF-2D-A-9127	900x1200x700	756	800	180
VF-2D-A-101510	1000x1500x1000	1500	1000	240
VF-2D-A-121510	1200x1500x950	1710	2000	280
VF-2D-A-102012	1000x2000x1200	2400	2500	300



**TUBITAK  
6. Technology  
Achievement Award**



# ROLLER HEARTH FURNACES



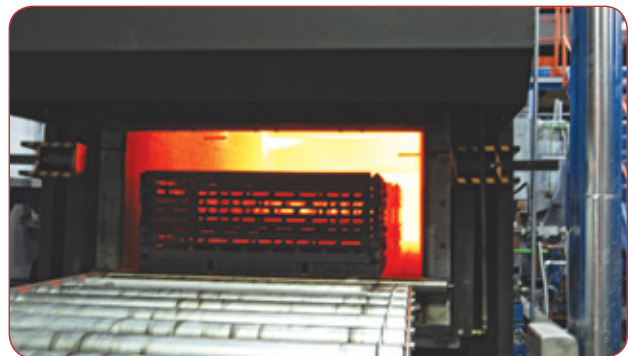
**LPG Cylinder Annealing Furnaces**



**Tube Bright Annealing Furnaces**



**Billet/ Bar Normalizing Furnaces**



**Continuous Type Isothermal Annealing and Hardening Lines**

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

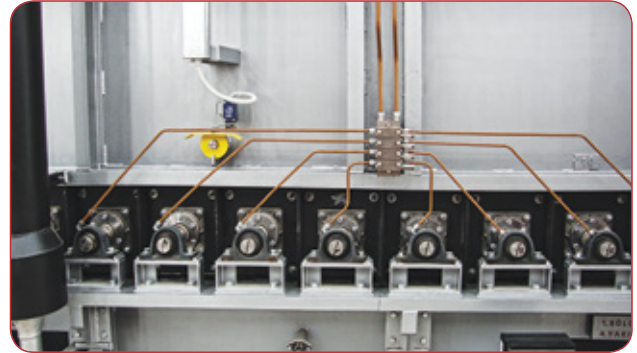




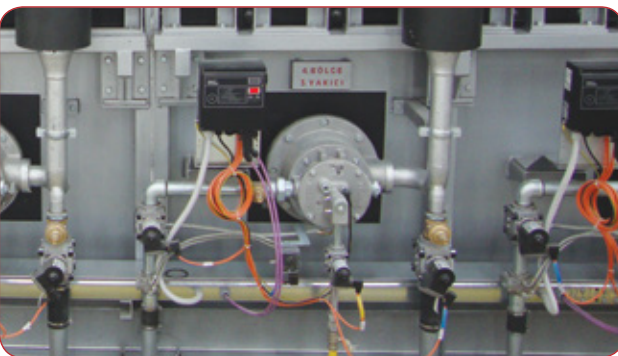
## ROLLER HEARTH FURNACES



*Refractory Lining*



*Automatic Lubrication*



*Self Recuperative Heating*



*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





## BOGIE TYPE FURNACES

- \* Gas or electrically heated
- \* Direct or indirect heating
- \* Modular 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

## SEALED QUENCH FURNACES AND LINES

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.



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

*Salt quench is available as optional.*



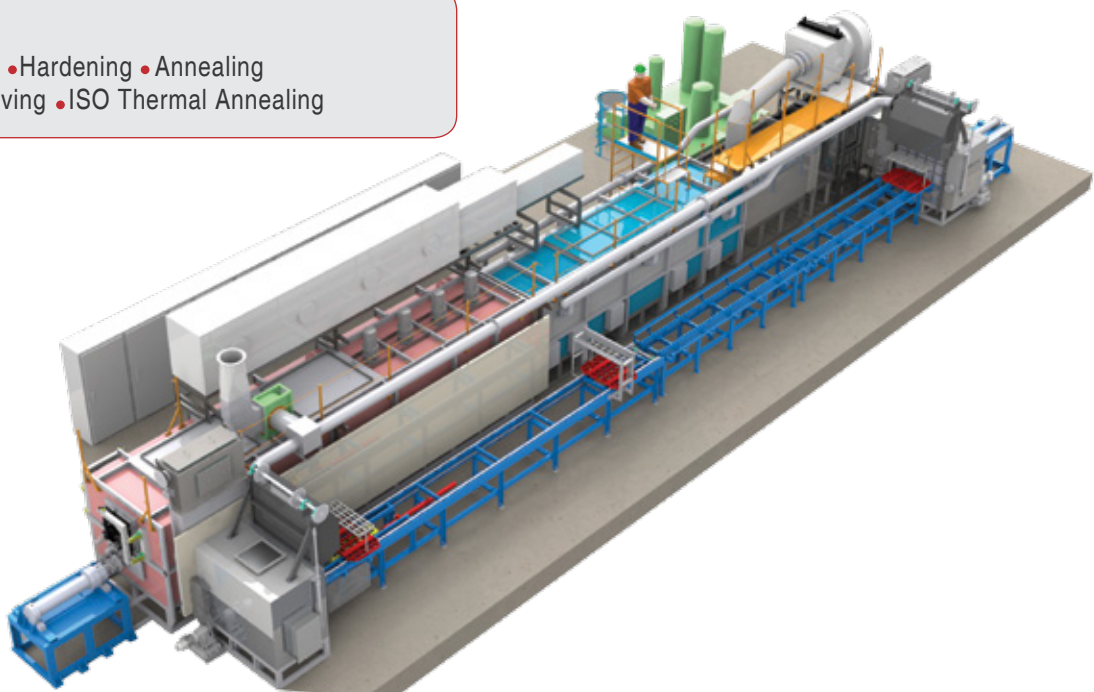
## PUSHER TYPE FURNACES

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



## MESH BELT CONVEYOR TYPE CONTINUOUS FURNACES

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

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



### Processes;

- Brazing
- Sintering
- Tempering
- Bright or Extra Bright Annealing

## FIRE RESISTANCE TEST FURNACES

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.

- 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

### 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.



**Gas Cleaning System**

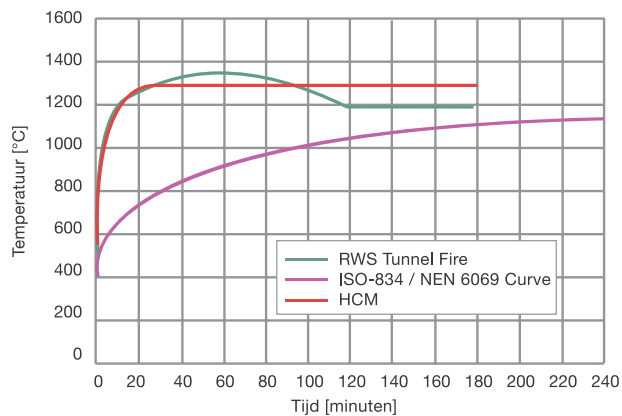


**Flexy Grand Combi Furnace**

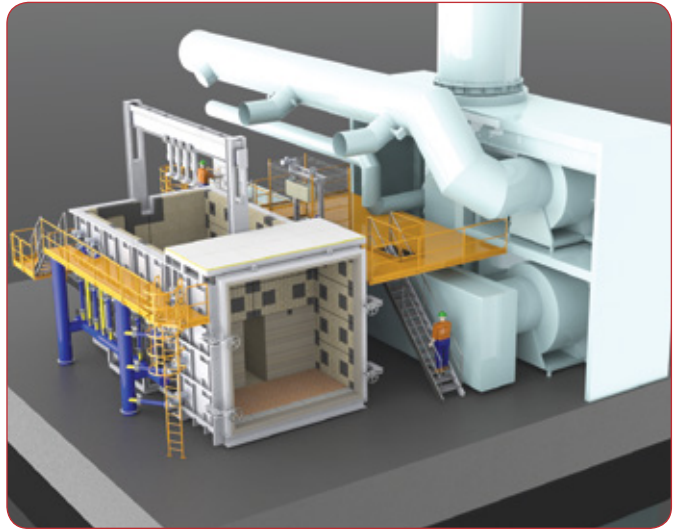
*Flexy technology is developed by Efectis to fulfill all requirements of fire resistance test without limitation of sizes.*



## HCM and RWS Curves

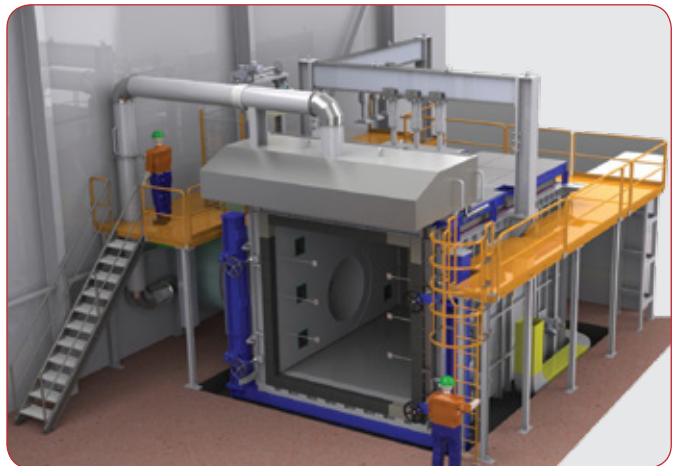


Our furnaces meets the requirements of the standards: EN 1363-1, EN 1363-2.



***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





## BELL & PIT TYPE FURNACES

*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
- N<sup>2</sup> & H<sup>2</sup> 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:

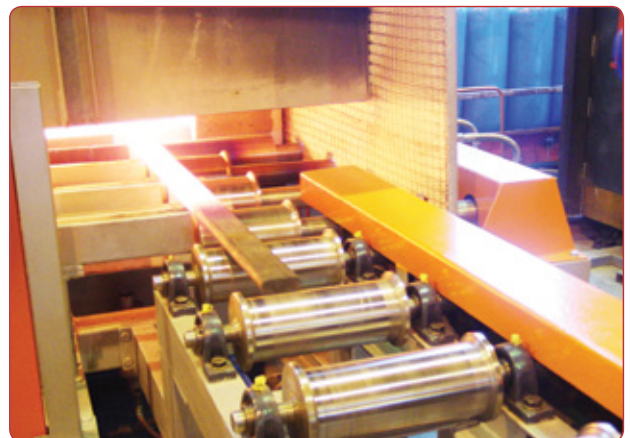
- Chain or Palette Conveyor
- Gas or Induction Heating
- Manual, Manipulator, Robotic Loading&Unloading
- Low Energy Consumption with Large turn-down ratio
- Low Decarburization with precise control of gas/air ratio



## 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







### **NOBODY CAN UNDERSTAND YOU BETTER! FOR YOUR SPARE PART NEEDS...**

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.

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 Homogeneity Test.

\* Maxon Servicing

\* Contacts:

**[www.sistemteknikfirin.com](http://www.sistemteknikfirin.com)**

[service@sistemteknik.com](mailto:service@sistemteknik.com)

Tel : +90 262 658 29 14

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Mob : +90 533 638 69 81



## \* USEFUL INFORMATION

**Our furnaces successfully comply with all or some of standards seen below;**

CE – Conformité Européenne

EN ISO – European Norms - International Organisation for Standardization  
9000 / 9001 / 11690-1 / 12100:2010 / 13850 / 1634-3 / 1299 +A1

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

Instrumentation	Type					Furnace Class	Temperature Uniformity	
	A	B	C	D	E		(°C)	(°F)
Each control zone has a thermocouple connect to the controller	x	x	x	x	x	1	±3	±5
Recording of the temperature measured by the control thermocouple	x	x	x	x		2	±6	±10
Sensors for recording coolest and hottest spots	x		x			3	±8	±15
Each control zone has a charge thermocouple with recording system	x	x				4	±10	±20
Each control zone has an over-temperature protection unit	x	x	x	x		5	±14	±25
	x	x	x	x		6	±24	±50

### Carburising & Nitriding Processes and Used Gases

Process	Temperature (°C)	Typical Process Time	Element Transferred	Case Depth (mm)	Surfaces Hardness (HV)
Carburising	850 - 950	4-10 h	C	0.2 - 1.5	750 - 850
Carbonitriding	750 - 900	2-5 h	C+N	0.1 - 0.8	750 - 850
Austenitic Nitrocarburising	600 - 700	2-4 h	N+C	0.1 - 0.5	750 - 850
Nitrocarburising	560 - 580	2-4 h	N+C	0.05 - 0.2	450 - 1200
Nitriding	500 - 510	5-100 h	N	0.05 - 0.8	450 - 1200



## Atmosphere constituents and their action

Active Gases				Neutral Inert Gases
Reducing	Oxidizing	Carburizing	Decarburizing	
H <sub>2</sub>	H <sub>2</sub> O	Co	H <sub>2</sub> O	N <sub>2</sub>
CO	CO <sub>2</sub>	CnHm	CO <sub>2</sub>	Ar
	O <sub>2</sub>		O <sub>2</sub>	He

## Typical atmosphere compositions

Volume % of Different Atmosphere Constituents						
Method	N <sub>2</sub>	H <sub>2</sub>	CO	CO <sub>2</sub>	H <sub>2</sub> O	CH <sub>4</sub>
Exogas	79	7	5	8	0.5	-
Endogas	40	40	20	0.3	0.7	-
Monogas	87	7	5	0.05	0.05	-
Cracked Ammonia	25	75	-	-	-	-

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

Temp			Steels							Temp.
°C	Fe	C	Low Alloy				High Alloy			°F
		0.08 to 0.45	eutectoid	C 0.4 Si 0.2 Mn 0.7 Cr 1.1 Mo Ni	0.4 0.2 0.7 1.1 0.2	0.5 2.0 0.9 0.2	1.2 0.2 13.0	0.1 0.7 0.4 18.0 8.1	0.7 0.3 0.3 4.3 W 18.5 V 1.1	
100	6.5	6.7	7.0	6.9	6.6	7.0	7.2	7.1	5.7	212
200	20.5	20.9	21.7	21.2	20.7	21.3	22.6	21.9	17.7	392
300	35.4	36.2	37.2	36.3	35.6	36.5	38.8	37.0	30.5	572
400	51.3	52.3	53.7	52.6	51.8	52.9	55.7	52.6	44.2	752
500	68.8	68.8	70.2	71.8	70.4	69.3	70.9	69.0	59.1	932
600	88.6	90.2	92.0	90.2	89.2	91.2	92.2	86.8	75.5	1112
700	110.8	113.0	114.4	112.7	11.4	113.5	110.1	104.2	92.8	1292
800	137.0	142.2	153.5	146.5	146.1	145.0	128.2	121.8	112.8	1472
900	157.4	165.5	170.7	162.4	162.1	162.2	146.5	139.7	132.5	1652
1000	178.3	183.6	187.8	179.6	178.8	179.8	165.1	157.7	148.7	1832
1100	194.7	202.0	205.4	197.0	195.7	197.8	184.1	176.0	165.8	2012
1200	212.0	220.4	223.8	214.2	213.3	216.3	203.4	194.6	182.8	2192
1300	230.3	238.9	242.8	231.9	231.1	235.3	222.9	213.4	199.7	2372

## NOTES





## NOTES



## NOTES

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