

# TeknoVak

INDUSTRIAL FURNACE SYSTEMS



- *Bell Type Furnace Systems*
- *Kn Controlled Gas Nitriding Furnaces*
- *Aluminium Heat Treatment Furnaces*
- *Cryogenic Cooling & Heating Systems*



## About Us..

- Strong research and development background on materials science and applications,
- Innovative design and turnkey system producing capabilities for all kinds of furnaces for the heat treatment processes on demand of critical industries,
- Unique facilities for design, analysis and manufacturing operations,
- Market-driven solutions as required by the related sectors, including aviation, defence, power and petrochemical production, etc..
- Highly qualified staff and technical team,
- Well-committed, sustainable relationships with customers.

- ✓ **Online Support**
- ✓ **Training**
- ✓ **Technical Control**
- ✓ **Consultancy**
- ✓ **Upgrade**
- ✓ **Inspection**
- ✓ **Spare Part Support**
- ✓ **Repair & Maintenance**
- ✓ **Start-up & Assembly**
- ✓ **Compliance & Safety Check**



**full service support**

**365 day**

**Teknovak Hotline :**  
**E-mail : [service@teknovak.com](mailto:service@teknovak.com)**  
**Tel : +90 530 692 00 00**

## Your Solution Partner

### Customized Solutions

Customer requirements about heat treatment applications of critical industries are received by our sales team. We deliver customized solutions to any technical and technological demands.

### Evaluation & Design

After receiving your request we evaluate it carefully to offer you accurate concepting and designing services. We compose products by checking analytical, numerical simulations and by virtually prototyping to get the customers confirmation.

### Project Planning

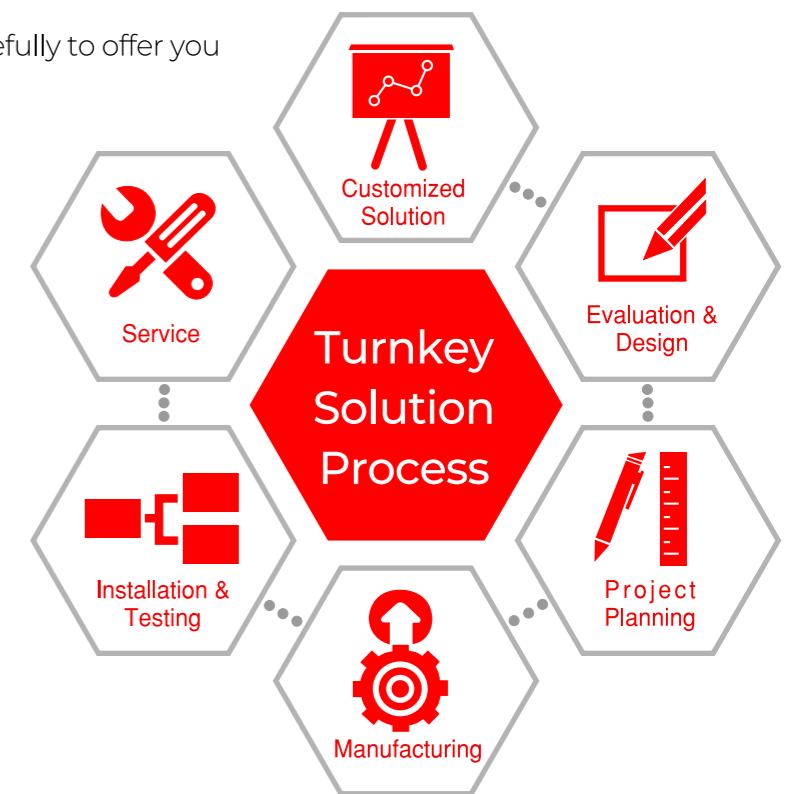
Planning the manufacturing process of the approved design is being realized with the hardwork of the experienced project team.

### Manufacturing

Following the planning, every stage of manufacturing process is held down by our experienced staff with precision.

### Installation and Testing

Installation, commissioning and final testing are carried out by our qualified service department.



### Service

We offer after sale services in a sustainable manner for full satisfaction of our customers.



## AGS Series



## Bell Type Hardening, Carburizing & Austempering Furnaces

### Standard Features

- ✓ Stange Electronic control and automation system,
- ✓ Atmosphere control with O<sub>2</sub> Sensor
- ✓ Nitrogen-methanol system,
- ✓ Repeatable processes,
- ✓ Minimum energy and gas consumption,
- ✓ Online process monitoring and recording system,

### Optional Features

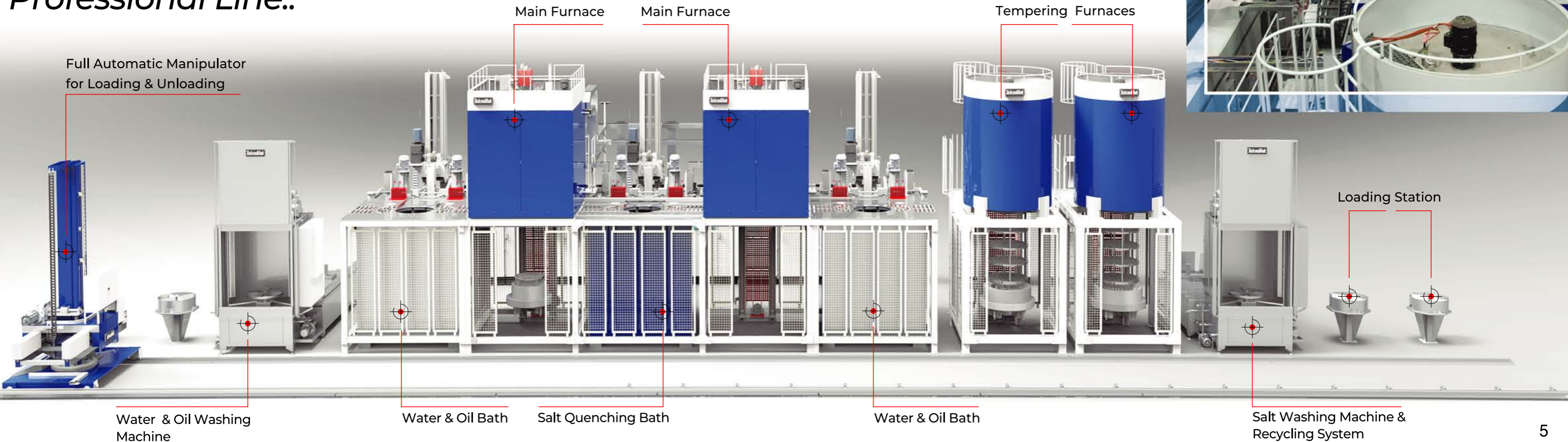
- ✓ Recipe management system,
- ✓ Compliance to AMS standards,
- ✓ Endogas generator,
- ✓ C-Level control for low CO with H<sub>2</sub> sensor
- ✓ Stange Carbo-DIS software with C-Level calculation and soot control.

### Process Capabilities

Process/Temperature°C	450 - 500	500 - 600	600 - 650	700 - 800	800 - 850	850 - 900	900 - 950	950 - 1050
Annealing & Normalizing				✓	✓	✓	✓	✓
Nitriding	✓	✓						
Nitrocarburizing		✓						
Oxidation	✓							
Carburizing								✓
Carbonitriding						✓		
Austempering					✓	✓	✓	✓
C-Austempering					✓	✓	✓	✓
Hardening					✓	✓	✓	✓
Soldering	✓	✓	✓	✓				
Brazing					✓	✓	✓	✓
Normalizing				✓	✓	✓	✓	✓
Boronizing				✓	✓	✓	✓	✓
Solution annealing	✓	✓	✓	✓	✓	✓	✓	✓
Aging	✓	✓	✓					
Salt quenching				✓	✓	✓	✓	✓
Water quenching				✓	✓	✓	✓	✓
Oil quenching				✓	✓	✓	✓	✓
Stress Relieving	✓	✓	✓					

Standard Sizes	Working Zone (Dia x H) (mm)	Load Cap. (Net Kg)	Electricity (Kw)
AGS-15	Ø420 x 600	150	60
AGS-30	Ø530 x 850	300	90
AGS-55	Ø700 x 1100	550	120
AGS-100	Ø850 x 1250	1000	150
AGS-150	Ø1000 x 1500	1500	240
AGS-200	Ø1250 x 1500	2000	300
AGS-250	Ø1250 x 1850	2500	360

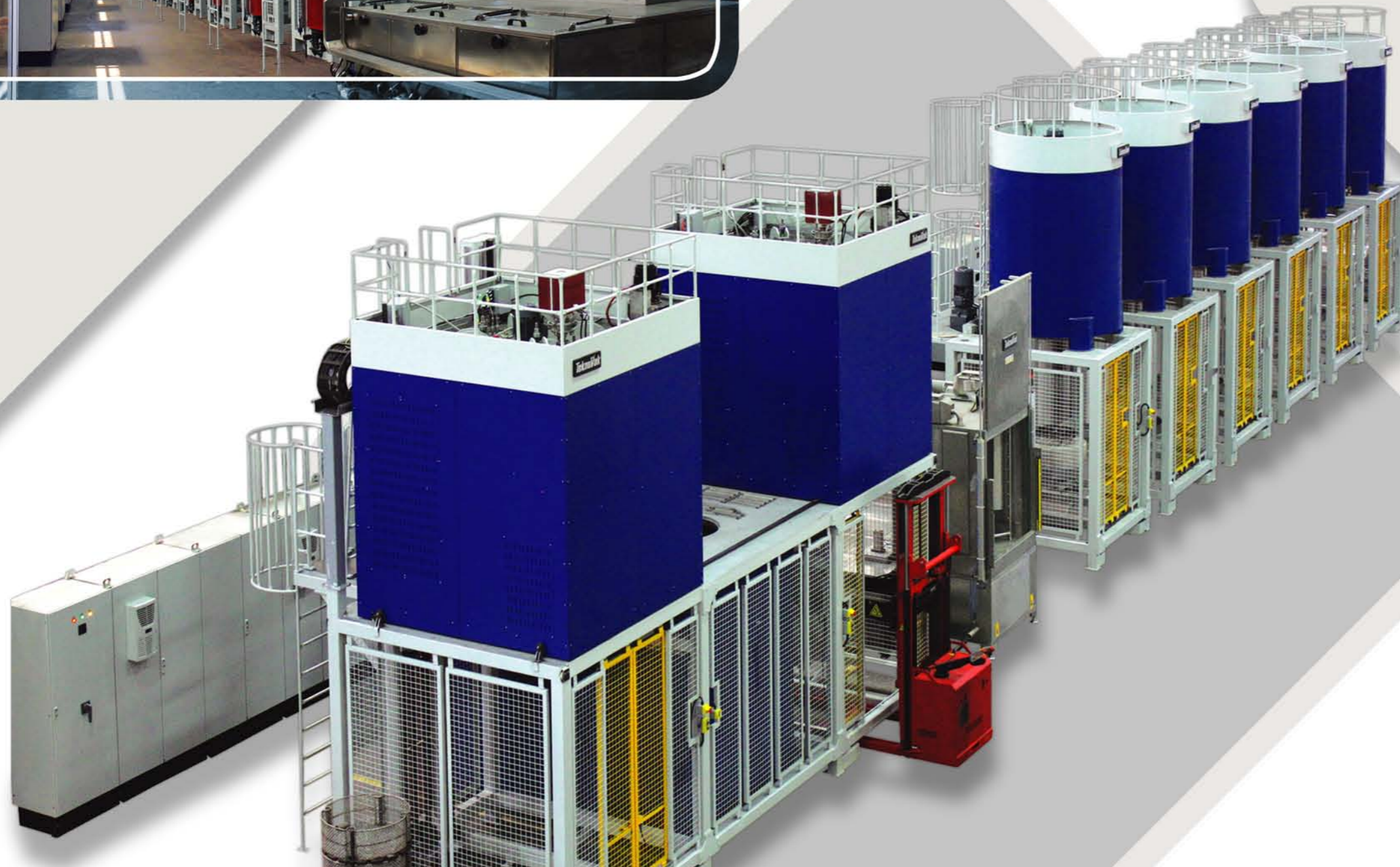
## Professional Line..



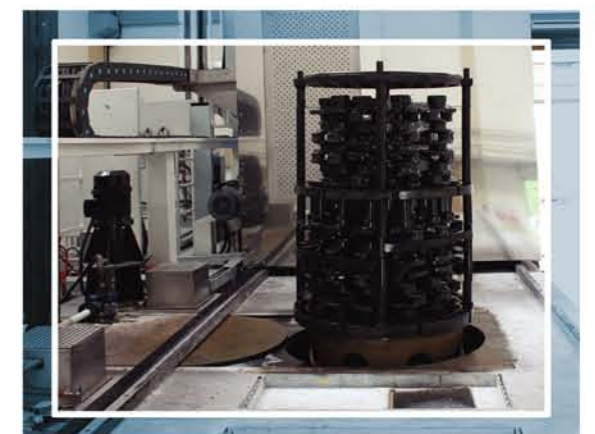


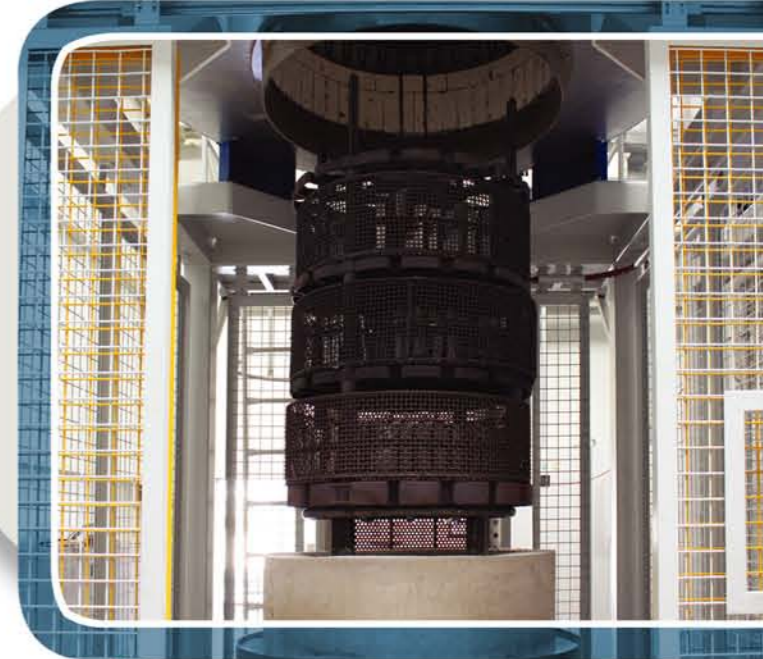
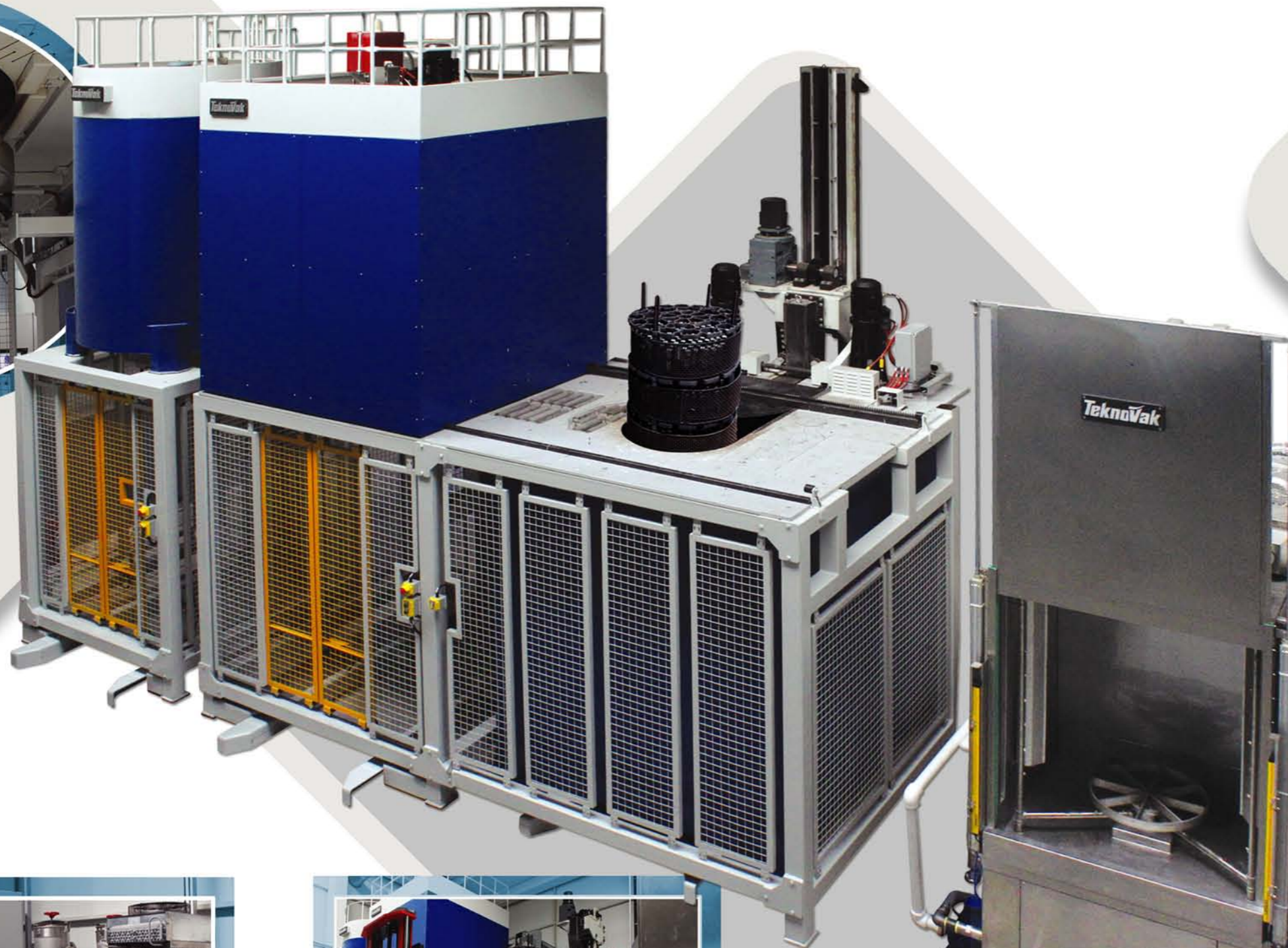
AGS Series

Bell Type Hardening, Carburizing & Austempering Furnaces





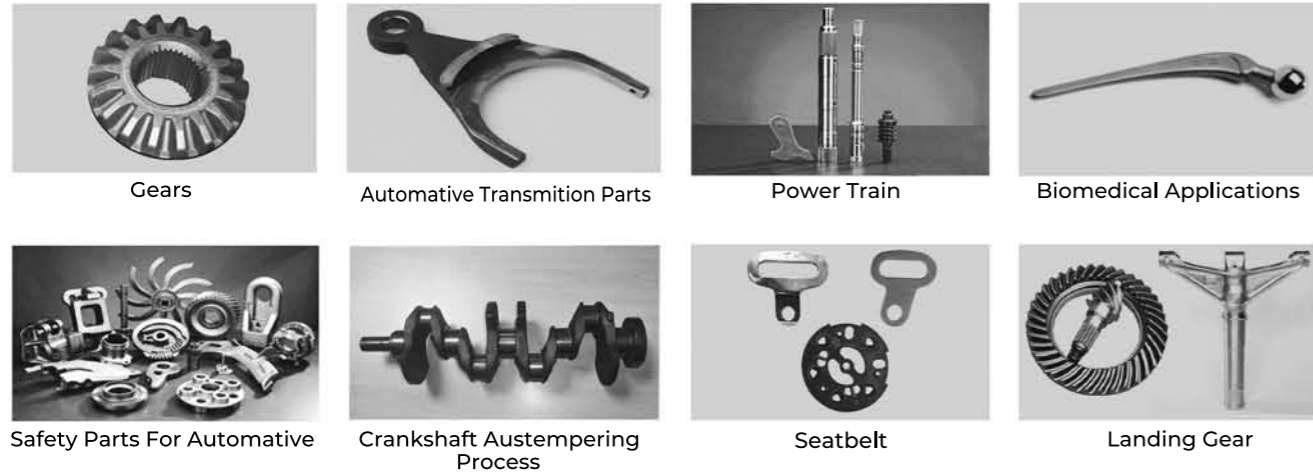




## AGS Series.. Specifications



### SOME APPLICATIONS



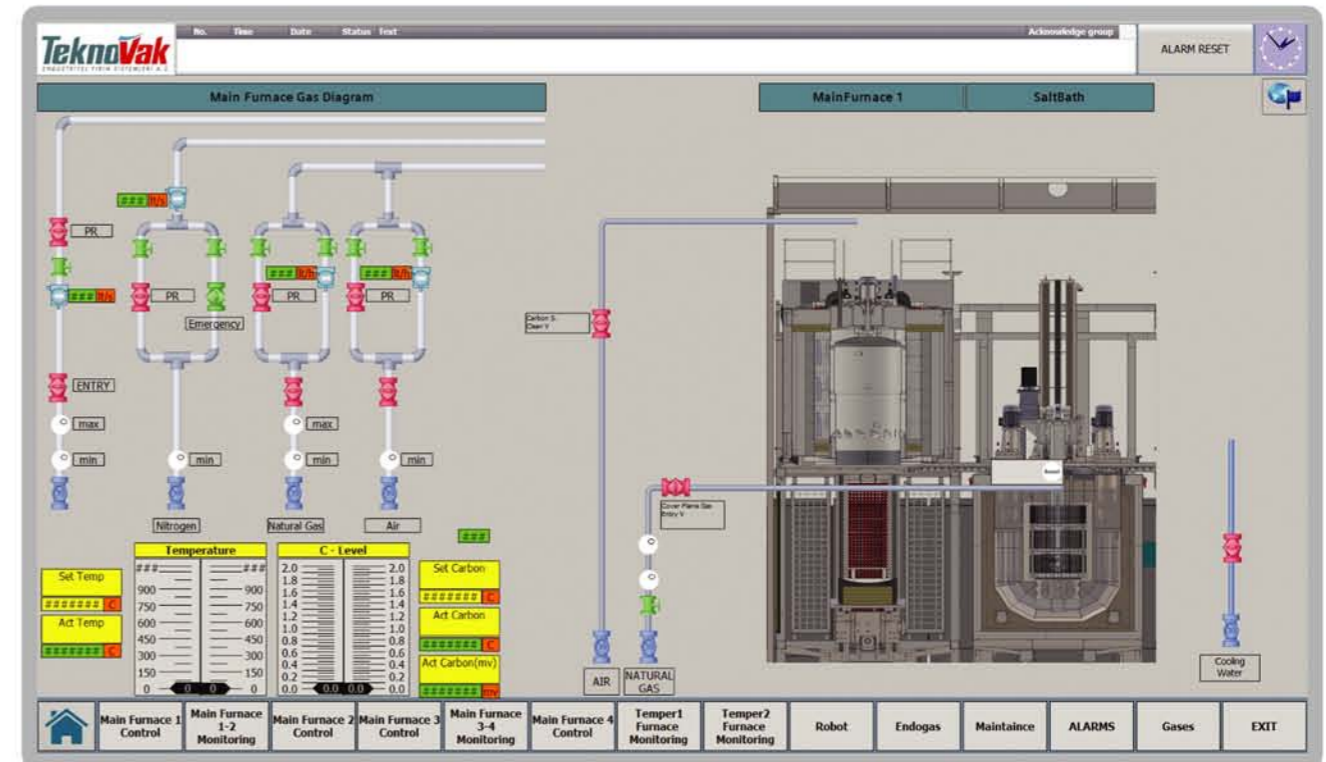
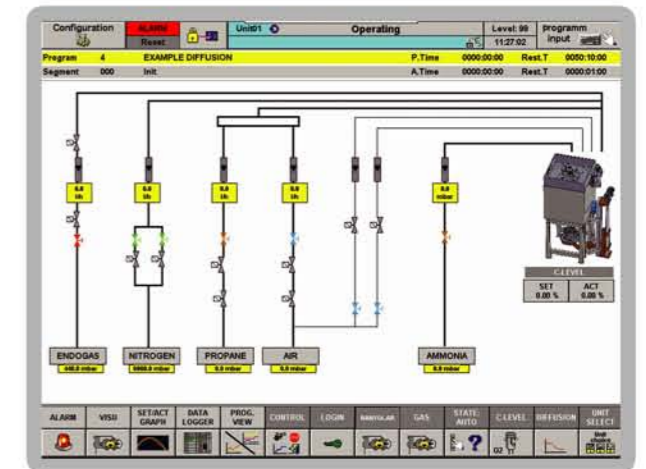
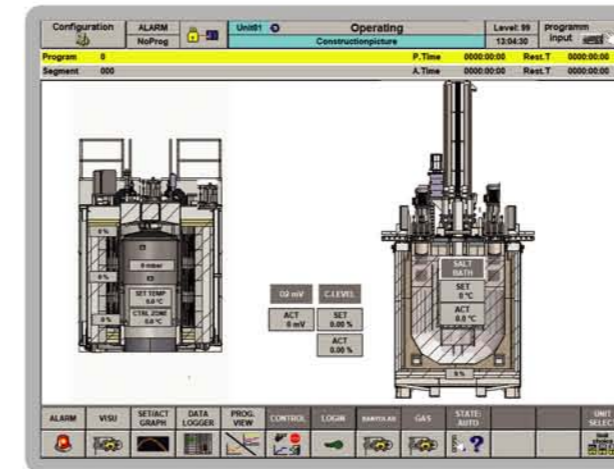
### ADVANTAGES OF THE SYSTEM

- Modular system for the multi processes by the different gas atmospheres,
- No vibration during the load transfer on the rollers,
- Salt, oil, water, multiple quenching mediums,
- Short transfer time to the cooling medium (less than 15 seconds),
- Capacity increasing possibility in the same line by adding furnaces and cooling tanks,
- To minimize distortion problem by the interrupting quenching,
- No heat and atmosphere loses during the load transfer,
- C-level control with oxygen and hydrogen sensors,
- Correct process control with STANGE-Carbo-DIS Software,
- Fast falls from carburizing temperature to hardening temperature,
- Repeatable and sustainable process capabilities.

### Our Global Partners



### Process simulation and control software Stange (Carbo-DIS)



## YGN Series

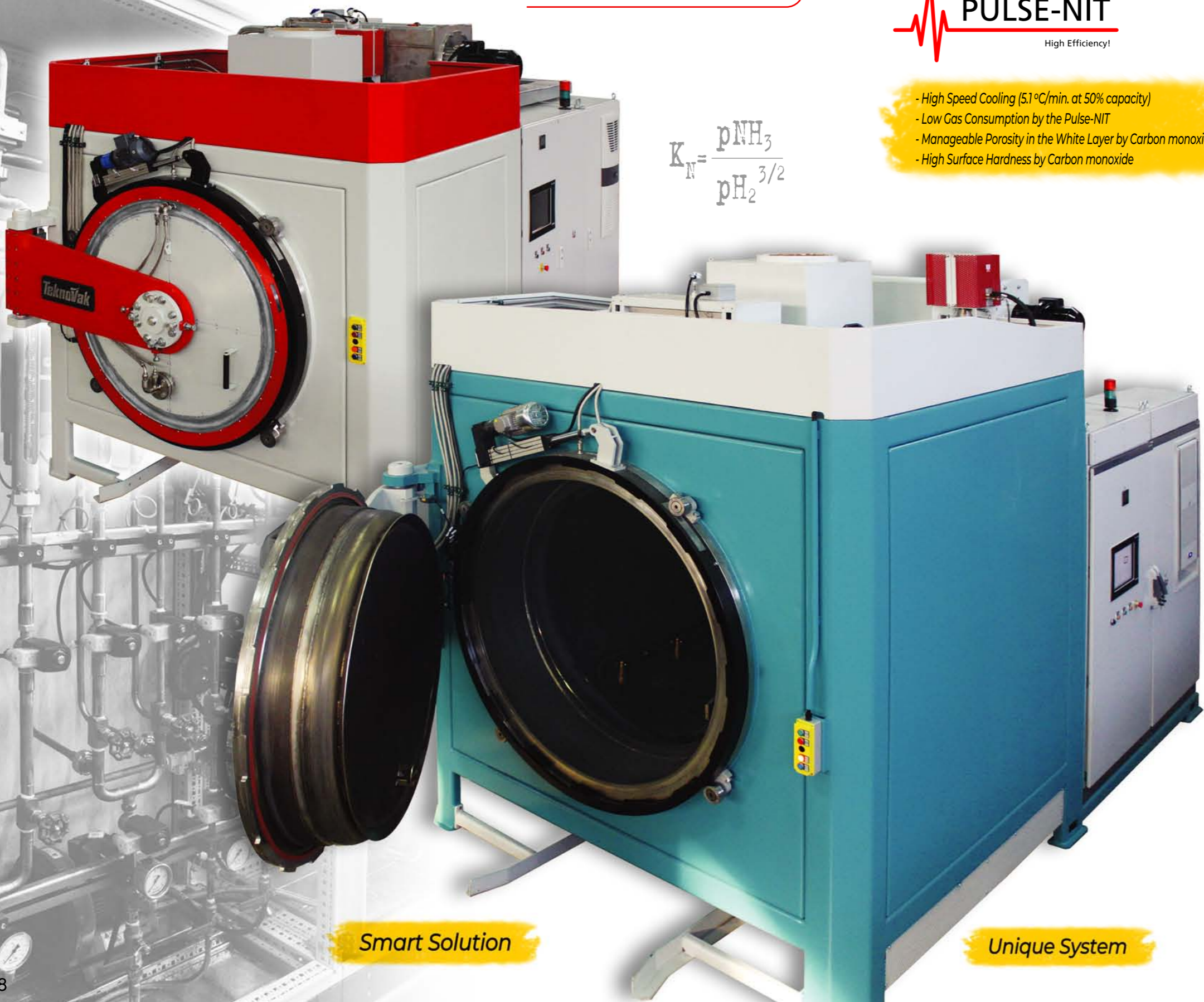
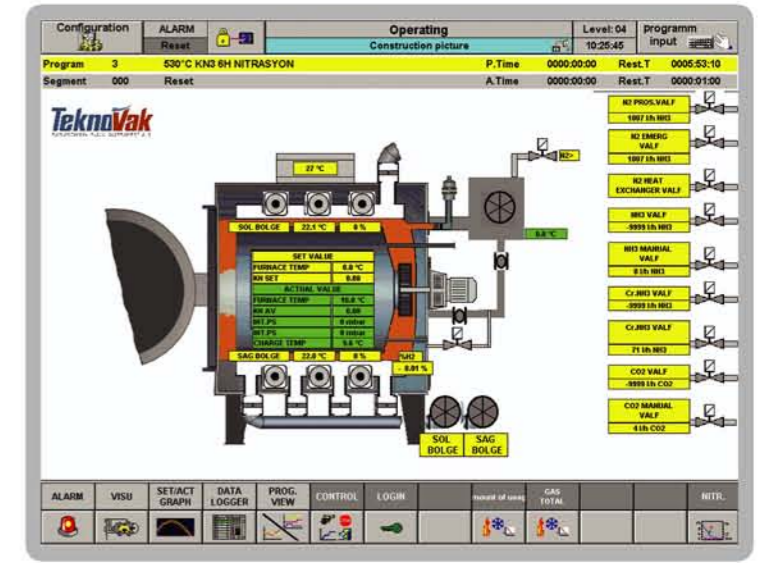
## Horizontal Gas Nitriding Furnaces

Heated By Electricity



- High Speed Cooling (5.1°C/min. at 50% capacity)
- Low Gas Consumption by the Pulse-NIT
- Manageable Porosity in the White Layer by Carbon monoxide
- High Surface Hardness by Carbon monoxide

$$K_N = \frac{p_{NH_3}}{p_{H_2}^{3/2}}$$



Smart Solution

Unique System

### OPTIONAL EQUIPMENTS



Standard Sizes	Working Zone (WxLxH) (mm)	Load. Cap. (Kg)	Heat Cap./Electric (Kw)
YGN-10	600 x 900 x 600	1.000	90
YGN-18	750 x 1050 x 750	1.800	135
YGN-25	900 x 1200 x 900	2.500	180
YGN-35	1050 x 1350 x 1050	3.500	240
YGN-50	1200 x 1500 x 1200	5.000	300

## DGN Series

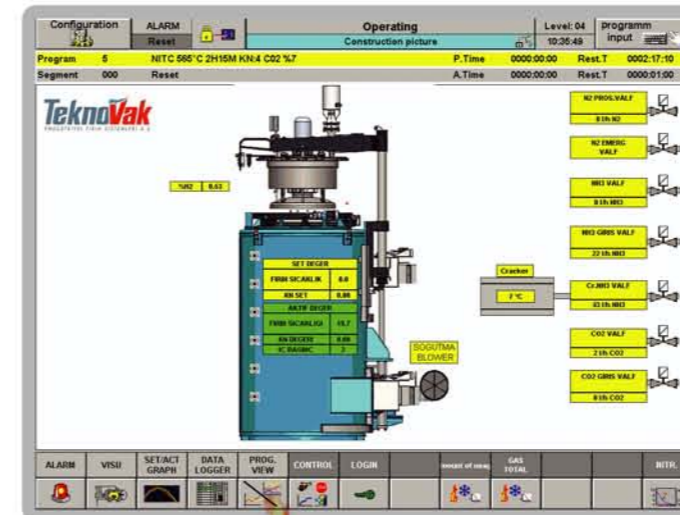
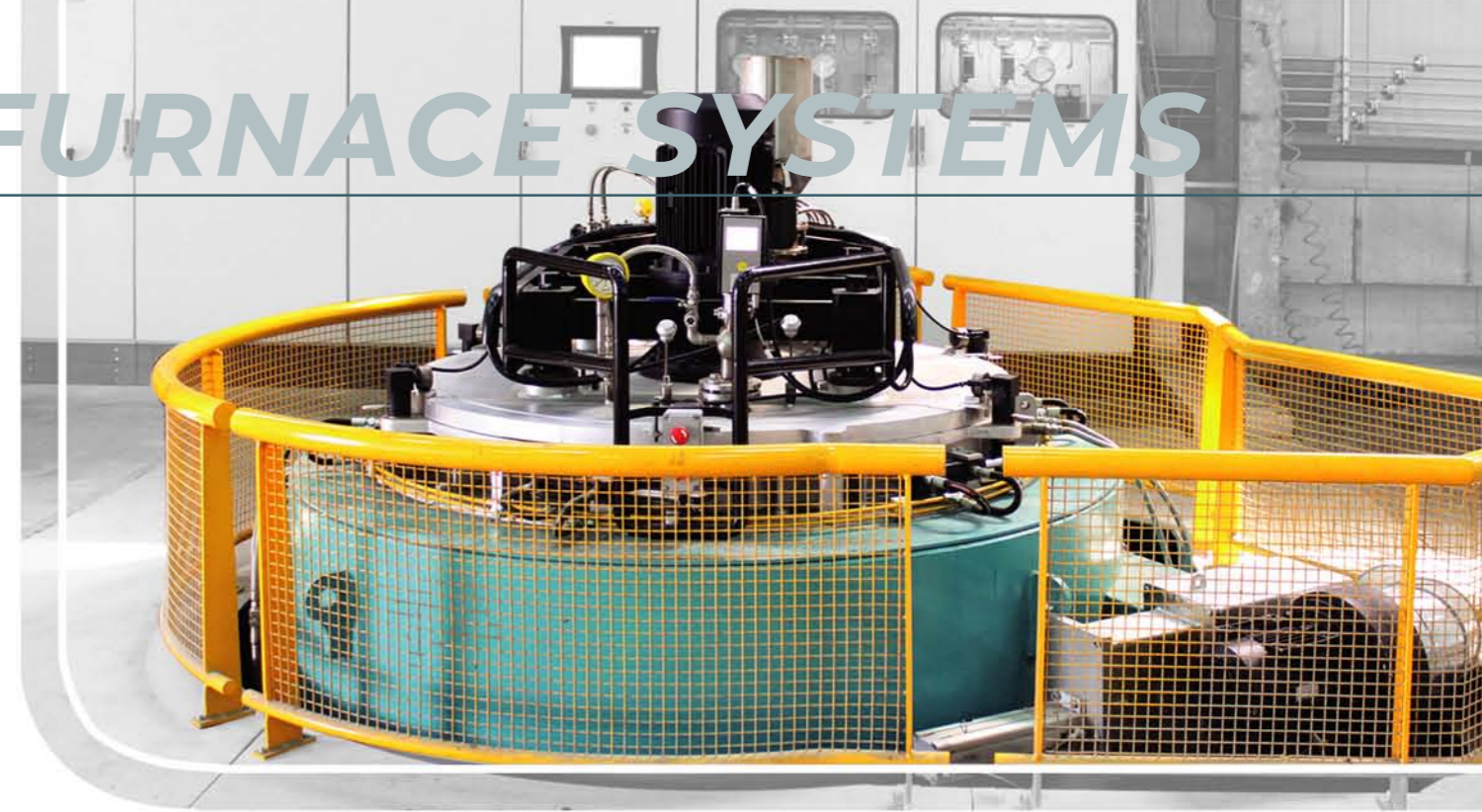
## Vertical Gas Nitriding Furnaces

Heated By Electricity

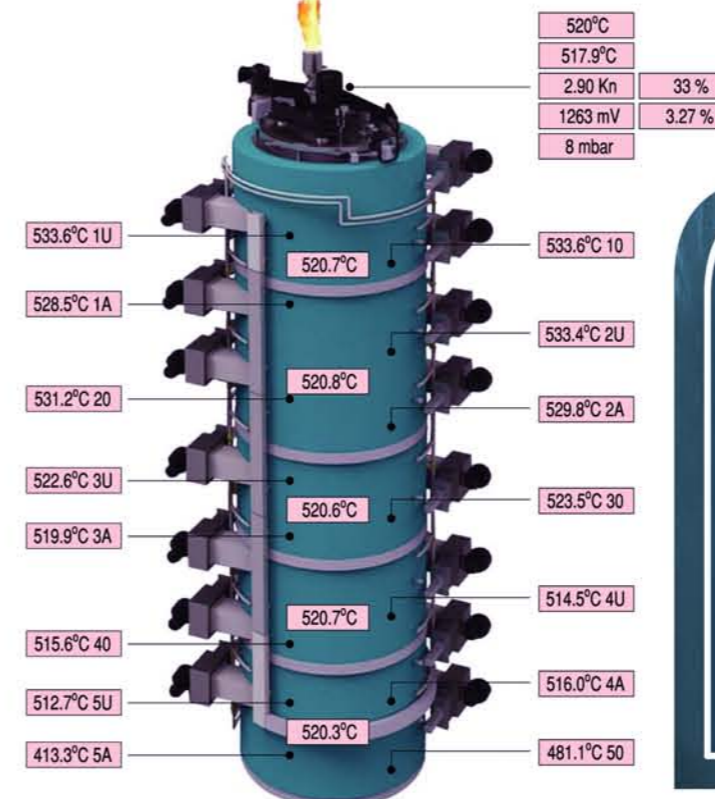


- High Speed Cooling (5.1 °C/min. at 50% capacity)
- Low Gas Consumption by the Pulse-NIT
- Manageable Porosity in the White Layer by Carbon monoxide
- High Surface Hardness by Carbon monoxide

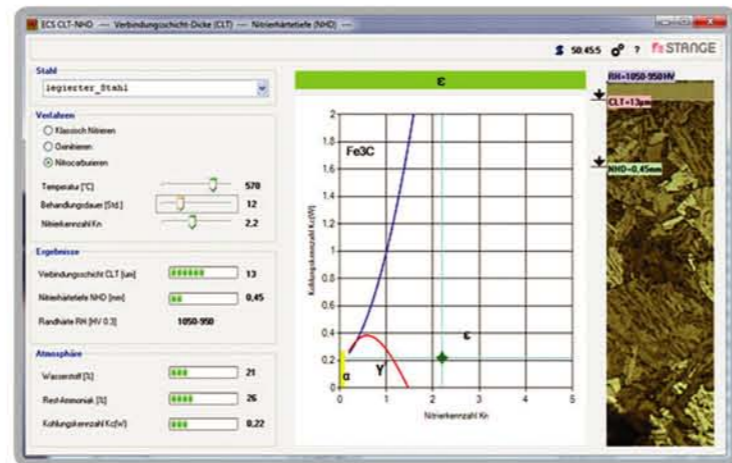
$$K_N = \frac{p_{NH_3}}{p_{H_2}^{3/2}}$$



Standard Sizes	Working Zone (ØxH) (mm)	Load. Cap. (Kg)	Heat Cap./Electric (Kw)
DGN-6	Ø630 x 900	600	60
DGN-10	Ø630 x 1500	1000	75
DGN-12	Ø800 x 1200	1200	80
DGN-16	Ø800 x 1500	1600	100
DGN-20	Ø800 x 1800	2000	120
DGN-22	Ø1000 x 1500	2250	135
DGN-25	Ø1200 x 1500	2500	144
DGN-30	Ø1000 x 2000	3000	160
DGN-33	Ø1200 x 2000	3300	192
DGN-35	Ø1500 x 1500	3500	210
DGN-40	Ø1000 x 4000	4000	225
DGN-50	Ø1500 x 2000	5000	240
DGN-60	Ø1200 x 5000	6000	270
DGN-100	Ø1200 x 8200	10.000	300



## YGN/DGN Series.. Specifications



### Specific Features

- Kn controlled nitriding & nitrocarburizing,
- Stange Electronic control and automation system
- Repeatable white layer & nitriding thickness,
- Minimum gas consumption,
- Online process monitoring & recording system,
- Process cost calculation,
- External fast & efficient cooling with double fan,
- Ready to use process recipe for 10 applications,
- 250 recipe registration possibility,
- AMS 2759/10 and 2759/12 compliance to standards,
- AMS 2750-H compliance to standards.

### Optional Features

- Oxidation
- Vacuum application,
- Heat exchanger for direct cooling,
- Surface activation,
- Neutralizer,
- Ammonia (NH<sub>3</sub>) vaporizer and filtration unit.

### Products

- YGN-Series / Horizontal Gas Nitriding Furnace
- DGN-Series / Vertical Gas Nitriding Furnace
- AP-Series / Ammonia Cracker
- E-NTR-Series / Neutralizers of Waste Gases



Nitriding & Oxidation

Excellent corrosion resistance up to 240 h

### Process Applications

- Kn Controlled Nitriding,
- Knc Controlled Nitrocarburizing,
- Ko Controlled Oxidation,
- Oxi-Nitriding,
- Vacuum Tempering,
- Thermal Etching,
- NH<sub>3</sub> Cracking,
- Neutralization of Waste Gases,
- Addition of CO process Gas.



Aviation industry, Custom 465  
Nitriding Depth: 18 μm ± 2 / 1100 HV

Aluminium extrusion die



For textile; sock dies



Crankshaft

### Our Global Partners

- Bürkert
- Kanthal
- Siemens
- SMC
- Thermal Ceramics
- Krom Schroder
- Leybold
- Unifrax
- Kirchner
- Phonix TM
- Schneider
- Millivolt
- Jumo



## DB Series

## Aluminium Heat Treatment Furnaces

### Furnace

- Drop bottom & Bell Type furnace,
- Heated by electricity with thyristor,
- Uniform heating over work load with fan,
- Variable speed electric fan motor,
- Stainless steel quenching tank.
- Integrated direct cooling & heating system for quenching tank,
- Polymer or water quenching,
- Less than 10 seconds quenching time,
- Special flow circulation design for water or polymer,
- Easy changeable filters,
- Automatic quench tank positioning,
- Automatic water level control,
- No pit required.

### Control

- Stange control unit SE-609 or SE-702,
- AMS 2750-H compliance to standards,
- -5°C temperature uniformity.
- Data recording and monitoring,
- Ease maintenance.
- Years of trouble-free operation.

### Heating Elements

Kanthal AF tubothal or equivalent heating elements for low surface current density.

### Insulation

- High insulation with ceramic boards and alumino silicate wool,
- No erosion with hot air circulation on the hardened ceramic boards,
- Low energy storage and heat losses,
- Special folded and stacked modules,
- Fiber boards, microporous, papers and blankets for excellent insulation.



*For Solid Solution & Aging*



Standard Size	Working Zone (WxLxH) (mm)	Load. Cap. (Kg)
DB-20	600 x 900 x 600	200
DB-75	900 x 1500 x 900	750
DB-200	1250 x 2500 x 1250	2000

Standard Size	Working Zone (Dia x H) (mm)	Load. Cap. (Kg)
BT-15	Ø530 x 850	150
BT-25	Ø700 x 1100	250
BT-40	Ø850 x 1250	400



## CRYO Series

## Cryogenic Cooling & Heating Systems



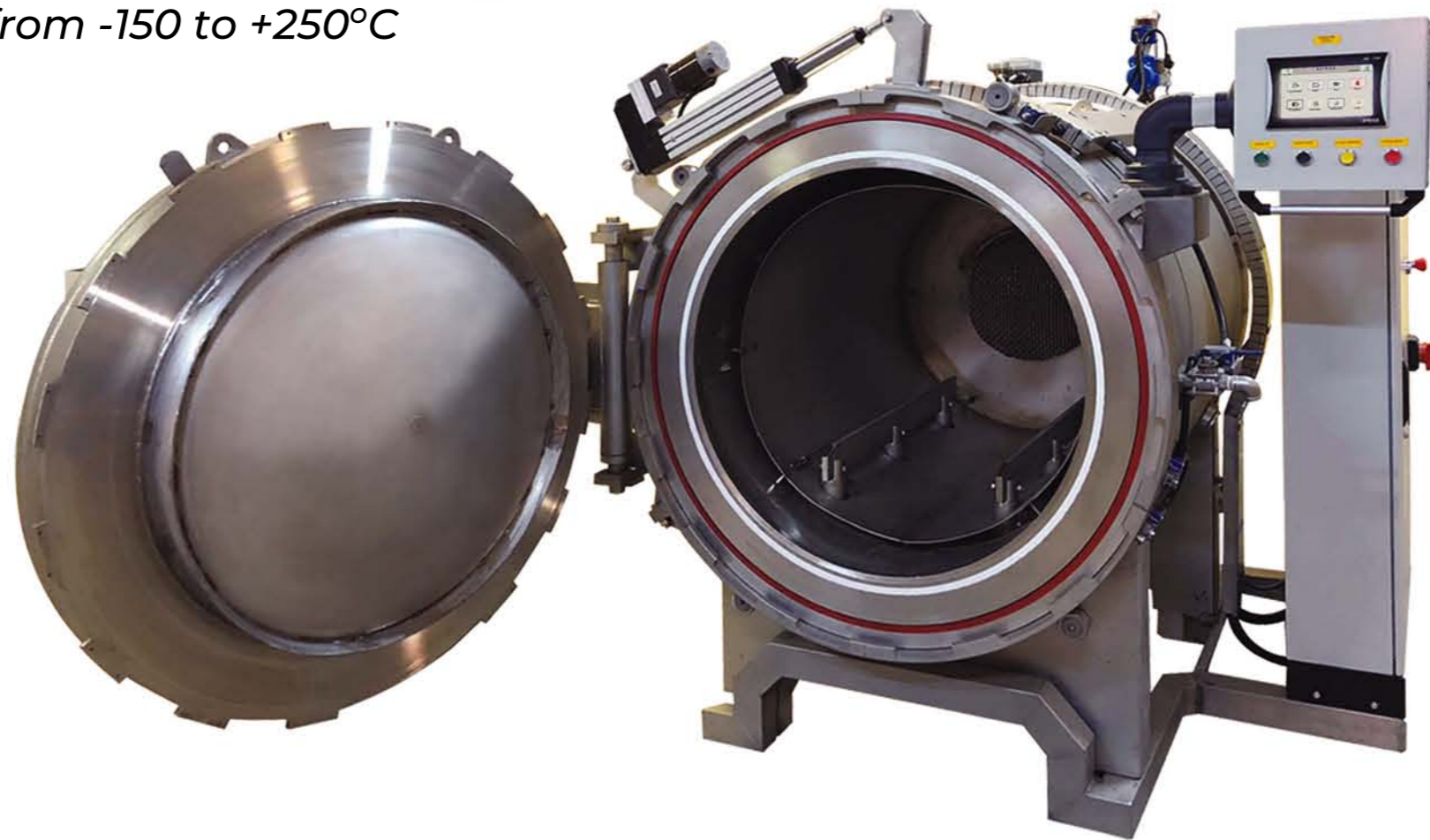
from -150 to +250°C

Vacuum Insulated

Standard Sizes	Working Zone (WxLxH) (mm)	Load Cap. (Kg)
CRYO-S	600 x 900 x 600	600
CRYO-M	900 x 1200 x 900	1.000

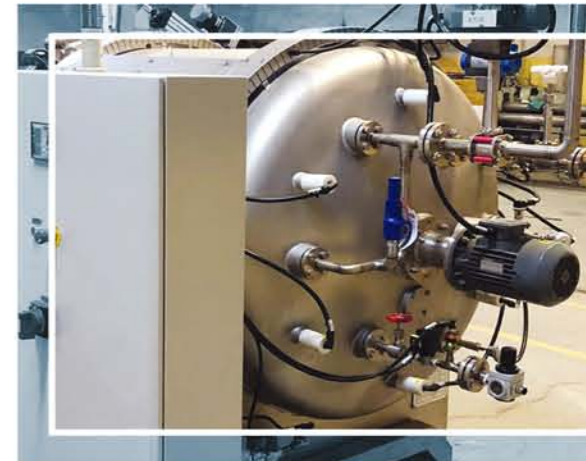
### CRYO SERIES FEATURES

- Stange control system for cooling and heating,
- Minimum heat losses due to vacuum insulated body and cover structure,
- Double walled retort structure,
- Recipe recording infrastructure,
- Pressure and flow control and minimum nitrogen consumption,
- Repeatable processes,
- Stainless steel construction,
- Unique and intelligent design,
- Dimensions suitable for vacuum quenching furnaces,
- $\pm 5^\circ\text{C}$  temperature uniformity,
- Safe pressure relief and safety valve before cover opening,
- **Maximum pressure** : 2 bar
- **Working pressure** : 100-500 mbar
- **Operating temperature** : from  $-150^\circ\text{C}$  to  $+250^\circ\text{C}$
- **Optional** : On heating  $620^\circ\text{C}$
- Gas nitrogen atmosphere during the tempering process,
- No corrosion effect and color change during processing.



### Applications

**Cutting tools** : sawing, milling, drilling, broaching, turning, slitting, shearing;  
**Metal forming tools** : dies, molds, punches.  
**High precision parts** : gauges, guides, shafts;  
**Parts of high performance (sport) car engines and transmissions** : crankshafts, connecting rods, piston rings, engine blocks, gear parts, camshafts.



Stange SE-702



### Advantages of Cryogenic Treatment

- Higher wear resistance
- Higher mechanical strength
- Better toughness
- Better fatigue strength
- Lower coefficient of friction
- Better grinding and polishing practices



STEELS	DIN 1.3343	DIN 1.2379	DIN 1.2436
Hardness After Quench	63 HRC	62 HRC	64 HRC
Stress Relieved (150°C)	63 HRC	61-62 HRC	62-63 HRC
Cryogenic Process (-150°C/6 Hours)	67 HRC	63-65 HRC	65-67 HRC



*Teknovak, your global solution partner..*



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