

# Link with **Thermal** Technology the Value

## Company Profile

**IHI Machinery and Furnace Co., Ltd.**

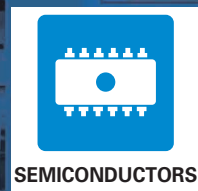
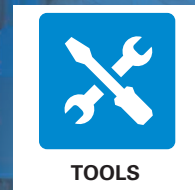


# Supporting People, Cities, Society Behind the Scenes.

IHI Machinery and Furnace Co., Ltd. manufactures and sells products that improve the quality of mechanical parts, such as vacuum heat treatment furnaces, vacuum carburizing furnaces and new material manufacturing equipment. We do business not only throughout Japan, but all over the world.

IHI Machinery and Furnace Co., Ltd. offers solutions for our customers' concerns and proactively engage in product maintenance and associated services.

We boast a strong track record in a variety of fields-ranging from aircraft, industrial machinery, automotive and others.



## More than 50 years experience and reliability

IHI has been supplying the highest quality furnaces to many customers in the above markets since the 60's and contributing to the customer's advanced technology.

## Sophisticated Japanese Technology

As a market leader, IHI fulfills the high level and strict requirements from Japanese customers and provides technical advanced heat treatment systems.

## Customer's satisfaction by wide range products

IHI offers innovative and most versatile equipment to the customers by its rich experience of providing customized equipment.

## IHI group synergy

As a general engineering corporation, IHI supports the customer with our synergy between each business area, global network and research & development. Especially in heat treatment environment, IHI is able to create new interesting value for the customer by synergy with our subsidiaries IHI VTN GmbH, IHI Ionbond AG and IHI Hauzer Tecno Coting B.V.



With our experience of installing over 1500 units worldwide, we offer a variety of vacuum furnaces to suit our customers’ products and heat treatment processes.

## Horizontal Vacuum Furnace

### Applications

Tempering, quenching, annealing, solution treatment, magnetic processing, aging treatment, brazing, etc.

### Features

- Great temperature uniformity great
  - Heater elements position: right, left, top and bottom
  - Three trimmable control zone: front, center and rear
- Wide cooling pressure range (87/130 - 600 kPa abs.)
- Selectable gas flow
- High cooling uniformity
- For bright parts



### PQ series (Pressurized gas cooling)

Model	PQ-34/22/42	PQ-42/33/65	PQ-65/50/100	PQ-80/80/130	PQ-100/100/140
Work zone (mm) Width × Height × Depth	340 × 220 × 420	420 × 330 × 650	650 × 500 × 1000	800 × 800 × 1300	1000 × 1000 × 1400
Temperature	Max. 1320°C / Normal operating temperature 540 - 1280°C				
Cooling gas pressure	87/130 - 200 (kPa abs.) (Option: 280 (kPa abs.))				
Load (kg)	60	180	450	800	1000

### NQ/SQ series (High pressure gas quenching)

Model	NQ (C)-40/40/65	SQ (C)-60/60/100	NQ (C)-80/80/130
Work zone (mm) Width × Height × Depth	400 × 400 × 650	600 × 600 × 1000	800 × 800 × 1300
Temperature	Max. 1320°C / Normal operating temperature 540 - 1280°C		
Cooling gas pressure	87/130 - 600 (kPa abs.)		
Load (kg)	200	600	1000

\*C: Convection heating, 6: 600 kPa abs. gas quench

### GQ series (gas cooling)

Model	GQ-23/18/40	GQ-34/23/58	GQ-52/43/83	GQ-67/69/110
Work zone (mm) Width × Height × Depth	230 × 180 × 400	340 × 230 × 580	520 × 430 × 830	670 × 690 × 1100
Temperature	Max. 1320°C / Normal operating temperature 540 - 1280°C			
Cooling gas pressure	87 (kPa abs.)			
Load (kg)	23	90	270	450

### VCH series (gas cooling)

Model	VCH-060912	VCH-161616	VCH-121830	VCH-161624	VCH-242436	VCH-243648
Work zone (mm) Width × Height × Depth	230 × 150 × 310	400 × 400 × 400	460 × 300 × 760	400 × 400 × 600	610 × 610 × 920	920 × 750 × 1220
Temperature	Max. 1320°C / Normal operating temperature 540 - 1280°C					
Load (kg)	35	90	210	250	450	600

\*Models available with pressurized gas cooling (PQ) and multi-flow (M) options

## Vertical Vacuum Furnace

### Applications

Tempering, quenching, annealing, solution treatment, magnetic annealing, aging treatment, brazing, etc.

### Features

- For long and large parts.
- High temperature uniformity thanks to the heater elements position 360 degree surrounded inside of the heating chamber
- Wide cooling pressure range (87 kPa abs.: VGQ, 87/130 - 280 kPa abs.: VPQ)



### VGQ/VPQ series

Model	VGQ-60/120	VGQ-90/90	VGQ-120/150	VPQ (BL) -120/120	VPQ (BL) -180/160	VPQ (BL) -200/350
Work zone (mm) Diameter × Height	600 × 1200	900 × 900	1200 × 1500	1200 × 1200	1800 × 1600	2000 × 3500
Temperature	Max. 1320°C / Normal operating temperature 540 - 1280°C					
Load (kg)	600	900	900	1300	1500	4000

\*BL: Bottom loading type

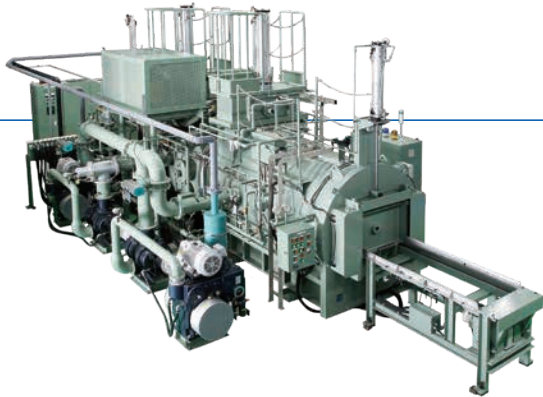
## Multi-chamber Vacuum Furnace

### Applications

Hardening, tempering, annealing, solution treatment, magnetic annealing, aging treatment, brazing, etc.

### Features

- Great temperature uniformity
  - Heater elements position: right, left, top and bottom
  - Three trimmable control zone: front, center and rear
- Wide cooling pressure range (87/130 -280 kPa abs.)
- For bright parts



### GQ-3C series

Model	GQ-3C-61/46/91	GQ-3C-91/76/140	GQ-3C-120/90/180
Work zone (mm) Width × Height × Depth	610 × 460 × 910	910 × 760 × 1400	1200 × 900 × 1800
Temperature	Max. 1300°C / Normal operating temperature 540 - 1280°C		
Load (kg)	450	1100	2000

## Vacuum Tempering Furnace

### Applications

Tempering, annealing, and aging

### Features

- Bright treatment thanks to Nitrogen purge
- High temperature uniformity
  - Heater elements position: 360 degree surrounded inside of the heating chamber
- High temperature uniformity thanks to convection fan
- Options : High vacuum, High temperature, etc.



### NVPT series

Model	NVPT-42/40/65	NVPT-60/60/100	NVPT-80/80/130
Work zone (mm) Width × Height × Depth	420 × 400 × 650	600 × 600 × 1000	800 × 800 × 1300
Temperature	Max. 750°C / Normal operating temperature 150 - 700°C		
Load (kg)	180	600	800

Fully-automated batch-type vacuum carburizing furnace

## Vacuum Carburizing Furnace (VCB Type)

### Features

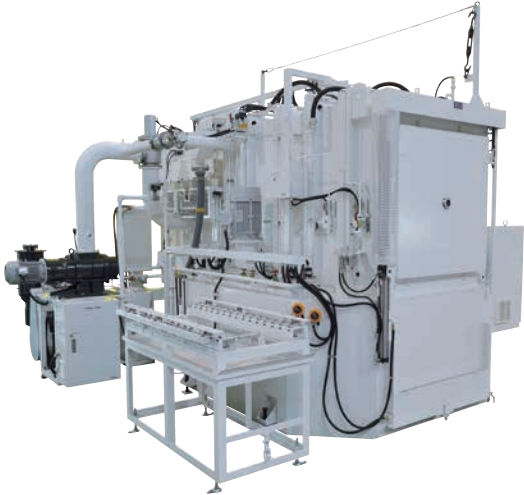
- High reliability
- Lower maintenance cost
- Low utilities costs
- Burnout function leads minimizing soot generation
- High energy efficiency and shorter treatment time due to high-temperature treatment

### Applications

- Carburizing, Oil quenching

Model	Work zone (mm) Width × Height × Depth	Load (kg)
VCB-161624	400 × 450 × 600	200
VCB-242648	660 × 650 × 1200	650
VCB-243048	760 × 650 × 1200	650
VCB-243048 (1 ton)	760 × 660 × 1220	1000

\* Grid included in height



Variable sizes are available! Suitable and efficient heat treatment is possible!

## Vacuum Degreaser (Immersion type)

### Features

- Great cleaning results in deep holes and blind holes, etc.
- Reduced waste with a mechanism for solvent distillation and regeneration
- Low maintenance frequency
- Low utilities costs
- Improved cleaning performance in deep holes and blind holes, etc.
- Equipped with immersion cleaning, shower cleaning, steam cleaning and drying mechanism

### Applications

- Remove and clean various oils (cutting oil, tempering oil, etc.) attached to products before/after heat treatment

Model	Work zone (mm) Width × Height × Depth	Load (kg)
HWBV-2V	520×450×920	250
HWBV-3V	660×650×1220	650
HWBV-4V	760×760×1350	1000



Built-in cryo-drying system-reduces drying time and cleaning-cycle time making it highly energy efficient. Moreover, by repeating the steam and shower cleaning processes, cleanliness of treated parts of various shapes/ improves dramatically.

## Vacuum Degreaser (Cryo-drying & Vapor cleaning type)

### Features

- Reduced cleaning time and high cleaning performance
- High energy-saving performance
- Minimal solvent
- Low running costs

### Applications

- Remove and clean various oils (cutting oil, tempering oil, etc.) attached to the products before/after heat treatment

Model	Furnace internal effective dimensions (mm) Width × Height × Depth	Load (kg)
IWV-34C	760×800×1350	1000

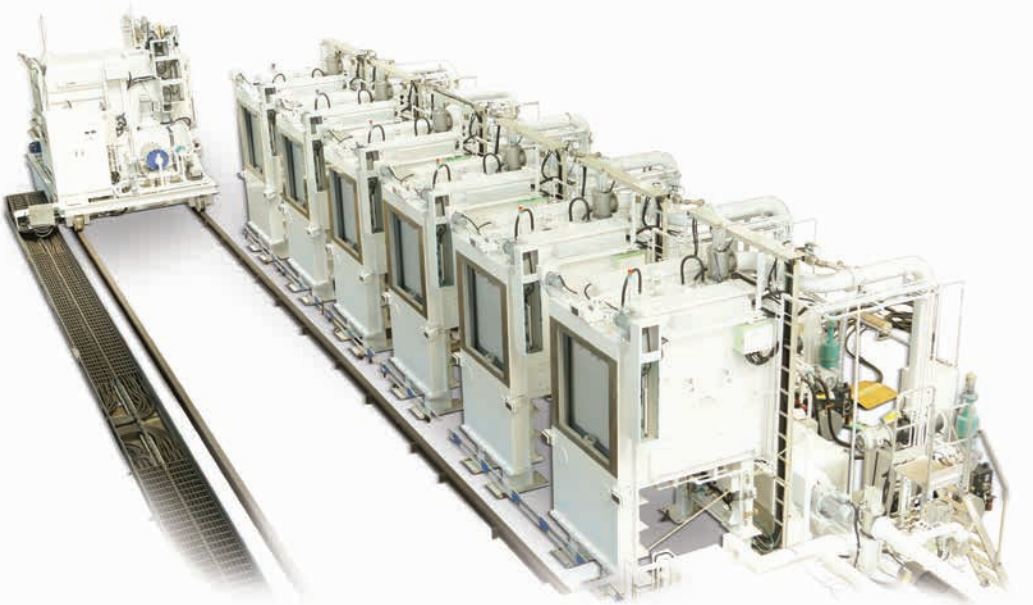


Low maintenance/easy-maintenance equipment with a configuration focused on carburizing and quenching quality. Continuous vacuum carburizing process allows the machine to improve its productivity.

## Mass-Production Vacuum Carburizers (V-Cell)

### Product configuration

- 6 Carburizing chambers (additional chambers possible)
- 1 Transfer cart with an oil quenching chamber
- 1 Loading/unloading mechanism
- Can be combined with a pre-/post-degreasing and cleaning machine and a tempering furnace to build a vacuum carburizing line



Model	Work zone (mm) Width × Height × Depth	Load (kg)
V-Cell	660 × 750 × 1200	650

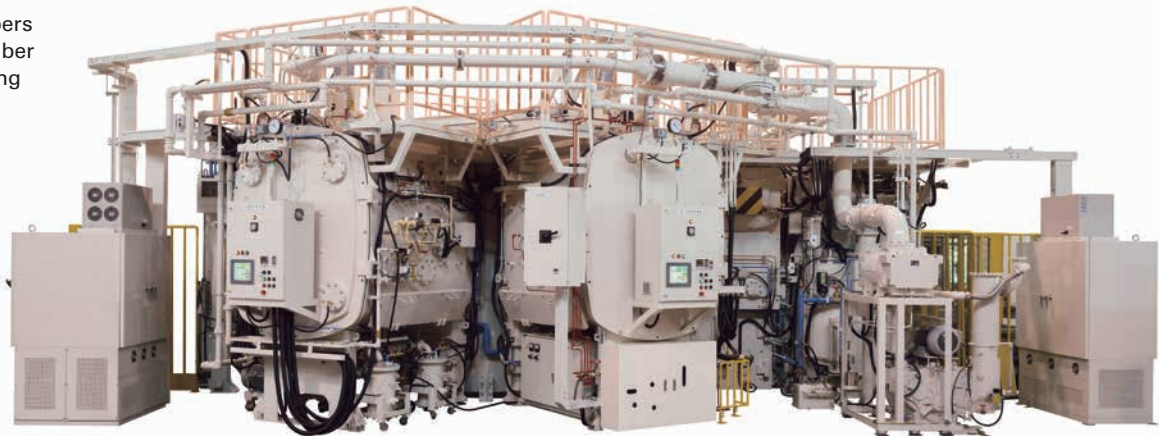
\* Grid included in height

Fully-automated and sophisticated multi-chamber vacuum carburizing furnace. Achieving high productivity while keeping initial costs to a minimum.

## Multi-Chamber Vacuum Carburizing Furnace (V-MALS)

### Product configuration

- 1-3 Heating chambers
- 1 Oil cooling chamber
- 1 Loading/unloading mechanism



Model	Work zone (mm) Width × Height × Depth	Load (kg)
V-MALS	650 × 650 × 1200	650

\* Grid included in height



Powder is placed in a graphite mold and pressed to make sintered body under high temperature and high vacuum conditions.

## Hot Press for Sintering

### Applications

Sintering of ceramic, target material, electronic material substrate

### Features

- Able to fabricate equipment to suit the product size
- High temperature uniformity thanks to the vacuum technology
- Wide temperature range (up to 2500°C)
- High pushing force (10,000 kN), high surface pressure treatment (70 MPa)
- Able to press from top and bottom directions
- High-speed cooling
- C/C molds can be adopted for large workpieces

Suitable for diffusion bonding, brazing and molding of metal, ceramics, compound materials, etc.

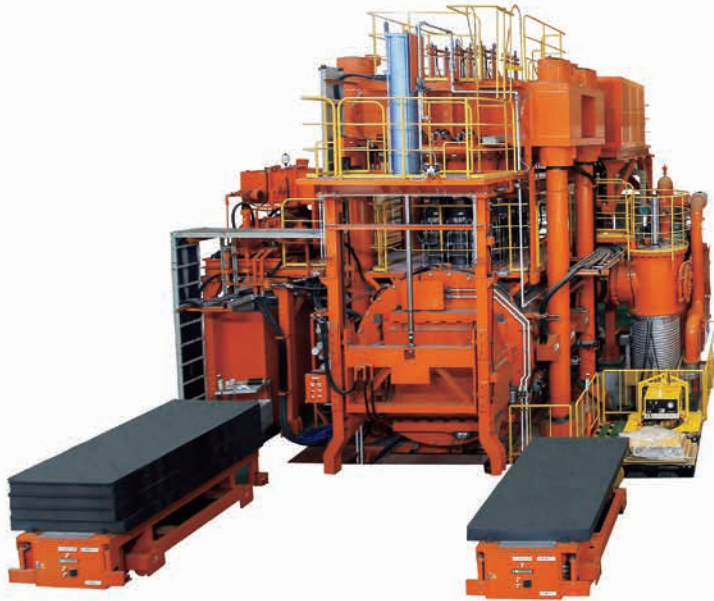
## Hot Press for Diffusion Bonding

### Applications

Diffusion bonding of heat exchangers, dies and metal/ceramics, brazing, forming

### Features

- Able to fabricate equipment to suit the treated product size
- Achieves high temperature holding accuracy applying vacuum furnace technology
- Wide temperature range (up to 1600°C)
- Able to select the number of press axes to suit the treated product size (Experience in 1 – 24 axes to date)
- Wide pushing force and surface pressure range
- High-speed cooling

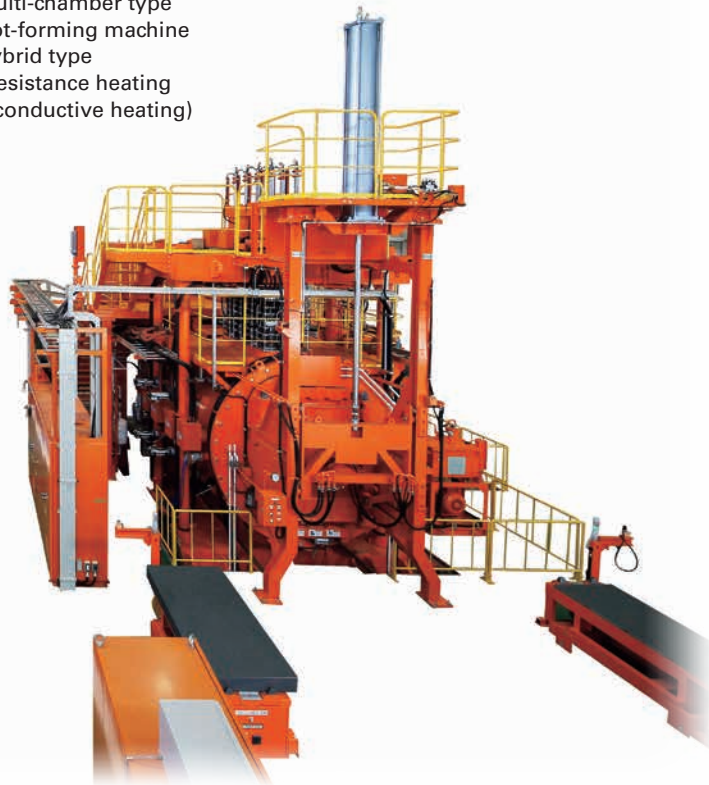


### Overview of hot presses

IHI began manufacturing of hot presses in 1984 and has carried out several model changes since to respond to customers' applications. We manufacture hot presses for sintering focused on sputtering targets and semiconductor ceramics, as well as hot presses for diffusion bonding focused on heat exchangers.

## Other Equipment

- Multi-chamber type
- Hot-forming machine
- Hybrid type  
(Resistance heating  
+ conductive heating)



From our wealth of experience and know-how, we aim to propose the right equipment based on customer specific treatment processes.

## Debinding and Sintering Furnace

### Applications

Sintering of ceramic, carbide powder, heat-resistant alloy powder, etc.

### Features

- High temperature uniformity by optimal furnace internal/ heater design
- Capable of high-speed gas fan cooling in pressurized atmospheres
- Capable of heat treatment in pressurized atmospheres
- Able to select exhaust control line/atmosphere control method to suit the specific treatment process (select pressure control method, H<sub>2</sub> and other gas types)

### (Typical specifications)

Model	(D)SGS-30/30/60-RF	(D)SGS-40/40/80-RF	(D)SGS-50/50/100-RF
Work zone (mm) Width x Height x Depth	300 x 300 x 600	400 x 400 x 800	500 x 500 x 1000
Temperature	Max. 1600°C / 2300°C		
Ultimate pressure	Max. 900 kPa abs.		
Overall weight (kg)	100	250	500



## Debinding, High Pressure Sintering Furnace

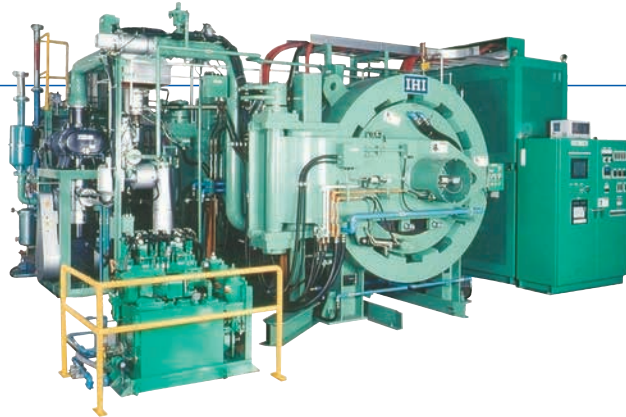
### Applications

Degreasing – sintering HIP treatment (carbide tools, etc.)

### Features

- Robust and reliable safety system
- Excellent temperature uniformity thanks to the heater elements alignment and our unique control system
- High speed cooling by heat exchanger and gas cooling system

Model	(D) SPS-30/30/60 (120)	(D) SPS-50/50/100
Work zone (mm) Width x Height x Depth	300 x 300 x 600 (1200)	500 x 500 x 1000
Temperature	Max. 1600°C / 2300°C	
Ultimate pressure	Max. 9.8 MPa / 5.9 MPa	
Overall weight (kg)	150 (300)	800



## Other Equipment

- Graphitizing furnace
- Purification furnace
- Carbonization furnace
- Carbon fiber manufacturing equipment
- Carbon composite manufacturing equipment

We pride ourselves with our flexibility towards a variety of customer needs, so please don't hesitate to contact us with any specific request (e.g. Sample testing, contract processing, etc.)



## A base to provide support for heat treatment processes

## Heat Treatment Technical Center

### Role of the Heat Treatment Technical Center

Heat treatment processes: Accumulation (organization) of fundamental data/Pursuit of applied technologies

Improve Center's capabilities

1. Collecting and organizing fundamental data on vacuum carburizing/vacuum heat treatment
2. Collecting information relating to heat treatment process technology (Japan/overseas, other manufacturers)
3. Pursuit applied technologies 2017 onwards: Accumulated effects and know-how of carburizing + nitriding

Support for product businesses, heat treatment contract business (high-level processes, etc.)

1. Sales support

- Support for specifications study relating to target equipment
- Verification of customer's requested specifications with a sample test

2. Post-order support

- Pre-installation verifications on equipment when product quality is a condition for acceptance (essentially this is confirmed prior to obtaining order)
- Quality confirmation upon delivery

Japan, China, SE Asia, Europe

Improving customer satisfaction level

1. Existing equipment

- Advise on concerns relating to heat treatment processes
- Provide solutions to problems relating to heat treatment processes (customer support)

2. Technological marketing

- [Equipment]
- Carburizing furnace – 3 (cold, semi-hot with carburizing/nitriding function)
  - Vacuum furnace – 2 RQ (260 (kPa abs.) metal shield)/NQPC (600 (kPa abs.) N<sub>2</sub>, Ar, H<sub>2</sub>)
  - Small lot treatment equipment
  - Cleaning machine – 2 cryo-dryers (C type) immersion cryo (V-C type)
  - Sintering furnace demo machine
  - Hot press demo machine for diffusion bonding
  - Electron probe microanalyzer EPMA



## Heat Treatment

Equipment

**IHI**  
**VIF**

Job Heat Treatment Service

**VTN** DIE  
HÄRTEREIEIEN  
**IHI**

**IHI**  
**VIF**

**IHI Machinery and Furnace Co.,Ltd.**

<https://www.ihico.jp/ims/>

江苏石川岛丰东真空技术有限公司

<http://www.ihifengdong.cn/>



Vacuum furnace



Vacuum carburizing furnace



Vacuum degreaser



Mass-production vacuum carburizers



Hot presses

**VTN** DIE  
HÄRTEREIEIEN

<https://www.ihivtn.com/en/>

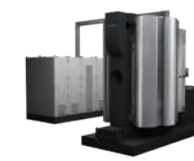


**HAUZER**

<https://www.hauzertechnocoating.com>



PVD / PACVD coating equipment



Cromatipic equipment

**BERNEX**

<https://www.ihibernex.com/en/>



CVD Coating Equipment

**ionbond**  
IHI GROUP

<http://www.ionbond.com/>



# IHI Machinery and Furnace Co., Ltd.

URL : <https://www.ihico.jp/ims/en/>

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Kakamigahara Works  
Heat Treatment Technical Center



Iwakuni Works

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Please send your inquiry with the below information to the above address directly.

Country;  
Company name;  
Your name;  
Tel;  
Mail;  
Your inquiry;

#### Safety Precaution

● In order to use this product correctly and safely, please make sure to read this instruction manual thoroughly prior to use.

● Information contained in this catalog is that as of September 2023.

● Note that specifications, dimensions and appearance contained in the catalog may be changed without notice for improvement.

● Note that the color tone of the product on the catalog may appear different from that of the actual product for reasons attributable to printing.

● Note that the addresses may be changed.

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