The IHI Group

IHI Corporation was established in 1853 and since then we have been continuously contributing to the development and expansion of industrial technology in Japan and beyond. Currently, the IHI Group has over 250 affiliated companies worldwide and more than 26,000 employees.

Business areas

The IHI Group develops, manufactures and supplies various products and solutions in the following four business areas:

- Resources, energy and environment
- Social infrastructure and offshore facilities
- Industrial systems and general-purpose machinery
- Aero engine, space and defense

Heat treatment and Surface treatment Technology

IHI installed the first vacuum heat treatment furnace in Japan for the aerospace industry. Later, thanks to synergy with industrial furnace technology, heat treatment has spread to various industries including automobile and construction machinery. Today, IHI supplies various heat treatment equipment and engages in the heat treatment process business. Furthermore, IHI introduced latest plasma coating technologies into PVD/PACVD coating and surface treatment equipment in the early stages, which have been utilized in various fields such as engine parts for automobiles and aircrafts.

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Dafeng 224100 Jiangsu, China
Vacuum Furnaces and Furnaces for Advanced Materials

IHI is one of the largest furnace manufacturers in the following industries.

More than 50 years experience and reliability

IHI has been serving in the vacuum industry for more than 50 years. Our customers worldwide rely on our quality products and services.

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 a comprehensive product line to meet the needs of various industries with a focus on advanced technologies.

IHI group synergy

As a general engineering corporation, IHI supports the customer with in-house capabilities and global network research & development. Especially in heat treatment environment, IHI is able to create new value for the customer by its group with our subsidiaries in the high tech coating activities, IHI Ionbond AG and IHI Hauzer Techno Coating B.V.

Vacuum Carburizing Furnace VCB

IHI offers a full automated batch type vacuum carburizing furnace with oven jar.

- The main advantages are:
  - High reliability
  - Low maintenance time and costs
  - Low capital costs
  - Preventing dust deposits build up by automated burn-off during operation
  - Energy efficient and short treatment cycles using high temperature
  - Clean and bright finish after treatment

Sintering Furnace

IHI develops and manufactures sintering furnaces with ample experience of custom-made sintering furnaces.

Applications:
- Ceramic materials (2300°C), Cemented carbide, nickel-base alloys, and others (1600°C)

- The advantages are:
  - High heating performance and good temperature uniformity
  - High vacuum gas cooling system
  - Options: De-waxing system, cooling performance (Marader)
  - High pressure gas heating
  - Selectable vacuum exhaust capacity
  - Cooling water circulation system
  - Atm pressure control (pressure control, He carrier gas)
  - High speed cooling system in the high temperature range

IHI offers a completely automated and integrated vacuum carburising furnace line with oil quench.

- The specifications include:
  - 1 to 3 Heating chambers
  - 1 Oil-Quench unit
  - 1 Loading / Unloading chamber

- Additional to batch type furnaces, these installations guarantee high output at low cost.

Auxiliary equipment

IHI offers tailored auxiliary equipment such as loaders, vacuum degreasers, tempering furnaces, vacuum systems, closed loop cooling systems, gas supplies and more.

Other products:
- Carbonizing furnace
- Graphitizing furnace
- Purifying furnace

Vacuum Carburizing Multi-Cell Furnace

IHI offers a full automated batch type vacuum carburizing furnace with oil quench.

- The main advantages are:
  - High reliability
  - Low maintenance time and costs
  - Low capital costs
  - Preventing dust deposits build up by automated burn-off during operation
  - Energy efficient and short treatment cycles using high temperature
  - Clean and bright finish after treatment

Sintering Furnace

IHI is a top manufacturer of (De-wax) high pressure sintering furnace that are consistently evaluated for safety and temperature uniformity for high performance material.

Applications:
- De-waxing, sintering, pre-sintering of cemented carbide alloys of tip drill, micro drill, die
- Pressure sintering of molded powder materials.

- The advantages are:
  - High safety
  - Optimal temperature uniformity
  - High speed cooling

IHI develops and manufactures sintering furnaces with ample experience of custom-made sintering furnaces.

Applications:
- Ceramic materials (2300°C), Cemented carbide, nickel-base alloys, and others (1600°C)

- The advantages are:
  - High heating performance and good temperature uniformity
  - High vacuum gas cooling system
  - Options: De-waxing system, cooling performance (Marader)
  - High pressure gas heating
  - Selectable vacuum exhaust capacity
  - Cooling water circulation system
  - Atmospheric pressure control (pressure control, He carrier gas)
  - High speed cooling system in the high temperature range

High Pressure Sintering Furnace

IHI offers a fully automated and integrated vacuum carburising furnace line with oil quench.

- The specifications include:
  - 1 to 3 Heating chambers
  - 1 Oil-Quench unit
  - 1 Loading / Unloading chamber

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Other products:
- Carbonizing furnace
- Graphitizing furnace
- Purifying furnace

Furnace for carbon fiber (Refurbishing furnace, carbonizing furnace, activating furnace)

Furnace for carbon composite production

Vacuum Furnaces and Furnaces for Advanced Materials

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  - High reliability
  - Low maintenance time and costs
  - Low capital costs
  - Preventing dust deposits build up by automated burn-off during operation
  - Energy efficient and short treatment cycles using high temperature
  - Clean and bright finish after treatment

Sintering Furnace

IHI develops and manufactures sintering furnaces with ample experience of custom-made sintering furnaces.

Applications:
- Ceramic materials (2300°C), Cemented carbide, nickel-base alloys, and others (1600°C)

- The advantages are:
  - High heating performance and good temperature uniformity
  - High vacuum gas cooling system
  - Options: De-waxing system, cooling performance (Marader)
  - High pressure gas heating
  - Selectable vacuum exhaust capacity
  - Cooling water circulation system
  - Atmospheric pressure control (pressure control, He carrier gas)
  - High speed cooling system in the high temperature range

IHI offers a completely automated and integrated vacuum carburising furnace line with oil quench.

- The specifications include:
  - 1 to 3 Heating chambers
  - 1 Oil-Quench unit
  - 1 Loading / Unloading chamber

- Additional to batch type furnaces, these installations guarantee high output at low cost.

Auxiliary equipment

IHI offers tailored auxiliary equipment such as loaders, vacuum degreasers, tempering furnaces, vacuum systems, closed loop cooling systems, gas supplies and more.

Other products:
- Carbonizing furnace
- Graphitizing furnace
- Purifying furnace

Furnace for carbon fiber (Refurbishing furnace, carbonizing furnace, activating furnace)

Furnace for carbon composite production

Vacuum Carburizing Multi-Cell Furnace

IHI offers a full automated and integrated vacuum carburising furnace line with oil quench.

- The specifications include:
  - 1 to 3 Heating chambers
  - 1 Oil-Quench unit
  - 1 Loading / Unloading chamber

- Additional to batch type furnaces, these installations guarantee high output at low cost.

Auxiliary equipment

IHI offers tailored auxiliary equipment such as loaders, vacuum degreasers, tempering furnaces, vacuum systems, closed loop cooling systems, gas supplies and more.

Other products:
- Carbonizing furnace
- Graphitizing furnace
- Purifying furnace

Furnace for carbon fiber (Refurbishing furnace, carbonizing furnace, activating furnace)

Furnace for carbon composite production
Vacuum Furnaces and Furnaces for Advanced Materials

IHI is one of the largest furnace manufacturers in the following industries:

- Automotive
- Aerospace
- Tool
- Electronic Devices
- Construction
- Agricultural
- Tool

More than 50 years experience and reliability

IHI has been supplying high-quality furnaces to meet demanding requirements in the above-mentioned field since 1960 and has continuously enhanced its advanced technology.

Sophisticated Japanese Technology

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

Customer's satisfaction by wide range products

IHI offers innovative and versatile equipment to the customer 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 the heat treatment environment, IHI is able to create new technology value for the customer by tight cooperation with our subsidiaries in the high temperature coating activities, IHI Ionbond AG and IHI Hauzer Techno Coating B.V.

IHI offers a full automated batch type vacuum carburizing furnace with oil quench.

The main advantages are:
- High productivity
- Low maintenance time and costs
- Low infrastructure costs
- Preventing soot deposit build up by automated burn-off during operation
- Energy efficient and short treatment cycles due to high temperature
- Clean and bright finish after treatment

IHI offers a completely automated and integrated vacuum carburizing furnace line with oil quench.

This specification includes:
- 1 to 3 heating chambers
- 1 oil quench unit
- Loading / Unloading chamber

IHI offers a full automated batch type vacuum carburizing furnace with oil quench.

IHI offers a Sintering furnace with ample experience of custom-made sintering furnaces.

Applications:
- Ceramic materials (2300°C), Cemented carbides, nickel-base alloys, and others (1600°C)

The advantages are:
- High heating performance and good temperature uniformity
- High pressure gas cooling system
- Options: De-waxing system, cooling performance (irradiators)
- High pressure gas heating
- Selectable vacuum exhaust capacity
- Cooling water circulation system
- Atmosphere control / pressure control, HD carrier gas)
- High speed cooling system in the high temperature range

IHI develops and manufactures sintering furnaces with ample experience of custom-made sintering furnaces.

Applications:
- Ceramic materials (2300°C), Cemented carbides, nickel-base alloys, and others (1600°C)

The advantages are:
- High heating performance and good temperature uniformity
- High pressure gas cooling system
- Options: De-waxing system, cooling performance (irradiators)
- High pressure gas heating
- Selectable vacuum exhaust capacity
- Cooling water circulation system
- Atmosphere control / pressure control, HD carrier gas)
- High speed cooling system in the high temperature range

IHI is a top manufacturer of (De-wax) high pressure sintering furnace that are consistently evaluated for safety and temperatures uniformity for high performance material.

Applications:
- De-waxing, sintering of sintered carbide alloys of hip joint, valves, chill iron
- Pressure sintering of molded precursor materials

The advantages are:
- High safety
- Optimal temperature uniformity
- High speed cooling

Other products:
- Carbonizing furnace
- Graphitizing furnace
- Purifying furnace
- Furnace for carbon fiber (refurbishing furnace, carbonizing furnace, activating furnace)
- Furnace for composite production

Vacuum Carburizing Furnace VCB

<table>
<thead>
<tr>
<th>Model</th>
<th>Size (mm)</th>
<th>Load (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VCB 90/100</td>
<td>1900 x 1000 x 1000</td>
<td>1000</td>
</tr>
<tr>
<td>VCB 95/110</td>
<td>2000 x 1100 x 1100</td>
<td>1500</td>
</tr>
<tr>
<td>VCB 110/120</td>
<td>2200 x 1200 x 1200</td>
<td>2000</td>
</tr>
</tbody>
</table>

Vacuum Carburizing Multi-Cell Furnace Low V-MALS

<table>
<thead>
<tr>
<th>Model</th>
<th>Size (mm)</th>
<th>Load (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>V-MALS 650</td>
<td>650 x 650 x 1200</td>
<td>650</td>
</tr>
<tr>
<td>V-MALS 800</td>
<td>800 x 800 x 1500</td>
<td>800</td>
</tr>
</tbody>
</table>

Vacuum Carburizing Multi-Cell Furnace Line V-MALS

<table>
<thead>
<tr>
<th>Model</th>
<th>Size (mm)</th>
<th>Load (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>V-MALS 400</td>
<td>400 x 400 x 1200</td>
<td>400</td>
</tr>
<tr>
<td>V-MALS 500</td>
<td>500 x 500 x 1500</td>
<td>500</td>
</tr>
</tbody>
</table>

Sintering Furnace

<table>
<thead>
<tr>
<th>Model</th>
<th>Size (mm)</th>
<th>Load (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SGS -50/50/100-RF</td>
<td>500 x 500 x 1000</td>
<td>500</td>
</tr>
<tr>
<td>SGS-30/30/60-RF</td>
<td>300 x 300 x 600</td>
<td>100</td>
</tr>
<tr>
<td>SGS-40/40/80-RF</td>
<td>400 x 400 x 800</td>
<td>250</td>
</tr>
</tbody>
</table>

High Pressure Sintering Furnace

<table>
<thead>
<tr>
<th>Model</th>
<th>Size (mm)</th>
<th>Load (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPS-30/30/60</td>
<td>300 x 300 x 600</td>
<td>150</td>
</tr>
<tr>
<td>SPS-50/50/100</td>
<td>500 x 500 x 1000</td>
<td>800</td>
</tr>
</tbody>
</table>

Auxiliary equipment

Selected ancillary equipment: IHI supplies tailored auxiliary equipment such as loaders, vacuum degreasers, tempering furnaces, vacuum coatings, production and transportation systems, closed up water cooling systems, gas supplies and more.
IHI developed a new vacuum carburizing system with Gas/Oil quenching for inline production and small quantity & large variety products.

Cleaning with IHI's vacuum degreaser provides the best conditions for a uniform carburizing process, vacuum operations, gas nitriding and other heat treatments. IHI offers a range of vacuum degreaser in several sizes.

The advantages are:
- Excellent cleaning result using vapor/steam of solvent
- No emissions, integrated recovery and oil separation
- Less preventive maintenance
- Low infrastructure costs
- Clean and bright finish after treatment, cleaning deep holes and gaps
- Immersion, spraying, vapor cleaning and drying in one installation

IHI offers a new type vacuum degreaser with low energy consumption. Our “Cryo Drying System” reduces drying time during the cleaning process. An improved drying system removes solvent from parts surfaces. Immersion is not required, therefore fine amount of stored solvent can be reduced.

The advantages are:
- Short cleaning time with high cleaning performance
- Low energy consumption
- Less stored solvent
- Low operation costs

IHI offers a hot press which sinters / bonds various materials such as sputtering target materials, ceramics, heat sink, etc. under high temperature and high pressure in a vacuum or an inert atmosphere. Since 1984, IHI developed and improved technology to meet the customer’s requirement.

This furnace creates sintered parts by pressing raw material in the heat chamber on high temperature and high pressure.

The advantages are:
- Furnace type, based on the workpiece
- Excellent temperature uniformity
- From 1000°C (for Sputtering target materials) to 2500°C (for ceramics)
- High pressing force (10,000 kN level) and high surface specific pressure (70 MPa)
- Top and bottom presses for improved productivity
- Rapid cooling

A hot press is an equipment which sinters / bonds various materials under high temperature and high pressure in a vacuum or an inert atmosphere. Since 1984, IHI developed and improved technology to meet the customer’s requirement.

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- Top and bottom presses for improved productivity
- Rapid cooling

This furnace bonds and molds a wide range of materials by pressing materials in the heating chamber at high temperatures.

The advantages are:
- Wide range of applications
- From 600°C for aluminum bonding to the 1600°C for metals with a high melting point
- Selection press axes according to application
- Wide range of pressing force
- Precise pressing force control
- Uniform surface pressure
- Rapid cooling

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The advantages are:
- Furnace type, based on the workpiece
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- Wide range of pressing force
- Precise pressing force control
- Uniform surface pressure
- Rapid cooling

Multi-Chamber Hot Press

Multi-Chamber Hot Press

Multi-Chamber Hot Press

Number of chamber | Dimensions / Load
--- | ---
1 - 3 chambers | ø 320 mm x h200 mm / 50kg
2 | ø 250 mm x h200 mm / 25kg

Multi-Chamber Hot Press

Multi-Chamber Hot Press

Multi-Chamber Hot Press

Multi-Chamber Hot Press

Multi-Chamber Hot Press

Multi-Chamber Hot Press
**Horizontal Vacuum Furnace**

IH offers various models of internal quenching vacuum furnaces enabling users to choose and handle various thermal processes for a variety of materials. IH has installed more than 1500 of these vacuum furnaces all over the world.

**Applications:**
- Quench-hardening, Tempering, Solution treatment, Aging, Annealing, Brazing

The advantages are:
- Excellent temperature uniformity:
  - By heating elements on top, bottom and both sides in chamber
  - 3-zones heating control
- Cooling gas pressure; variable High/Low pressure
- High pressure gas cooling system
  - Reduced cooling time
  - Enable to heat treat a wide variety of metals
- Cooling gas flow:
  - Bottom to top
  - Top to bottom
  - Top to bottom/Bottom to top
- Minimal distortion; Large gas flow guarantees uniform cooling pattern
- Clean and bright finish after treatment

**PQ series (High pressure cooling)**

<table>
<thead>
<tr>
<th>Model</th>
<th>PQ(P)(C)-34/22/42</th>
<th>PQ(P)(C)-42/23/56</th>
<th>PQ(P)(C)-65/60/100</th>
<th>PQ(P)(C)-44/46/130</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size (mm)</td>
<td>340(W) x 220(H) x 420(L)</td>
<td>420(W) x 230(H) x 560(L)</td>
<td>650(W) x 600(H) x 1000(L)</td>
<td>440(W) x 460(H) x 1300(L)</td>
</tr>
<tr>
<td>Temperature</td>
<td>Max: 1320°C / Working range: 540~1300°C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooling pressure</td>
<td>0.87 to 2.0 bar (option: 2.8 to 6.0 bar)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Load (kg)</td>
<td>80 kg</td>
<td>100 kg</td>
<td>400 kg</td>
<td>800 kg</td>
</tr>
</tbody>
</table>

**RQ series (High pressure gas cooling)**

<table>
<thead>
<tr>
<th>Model</th>
<th>GQ-61/46/91</th>
<th>GQ-VQ-120/90/150</th>
<th>GQ-3C-91/76/140</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size (mm)</td>
<td>ø600 x 1100(H)</td>
<td>ø650 x 850(H)</td>
<td>ø1200 x 1500(H)</td>
</tr>
<tr>
<td>Temperature</td>
<td>Max: 1320°C / Working range: 540~1300°C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Load (kg)</td>
<td>850 kg</td>
<td>800 kg</td>
<td>1300 kg</td>
</tr>
</tbody>
</table>

**VQ series (Underpressure gas cooling)**

<table>
<thead>
<tr>
<th>Model</th>
<th>GQ-24/18/46</th>
<th>GQ-61/46/91</th>
<th>GQ-24/18/46</th>
<th>GQ-3C-91/76/140</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size (mm)</td>
<td>ø200 x 1100(H)</td>
<td>ø600 x 900(H)</td>
<td>ø200 x 1100(H)</td>
<td>ø200 x 1100(H)</td>
</tr>
<tr>
<td>Temperature</td>
<td>Max: 1320°C / Working range: 540~1300°C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Load (kg)</td>
<td>23 kg</td>
<td>80 kg</td>
<td>270 kg</td>
<td>450 kg</td>
</tr>
</tbody>
</table>

**VCH series (High pressure gas cooling)**

<table>
<thead>
<tr>
<th>Model</th>
<th>VQH-120/120</th>
<th>VQH-120/150</th>
<th>VQH-90/90</th>
<th>VQH-24/24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size (mm)</td>
<td>230(W) x 120(H) x 120(L)</td>
<td>400(W) x 400(H) x 400(L)</td>
<td>600(W) x 600(H) x 600(L)</td>
<td>250(W) x 250(H) x 250(L)</td>
</tr>
<tr>
<td>Temperature</td>
<td>Max: 1320°C / Working range: 540~1300°C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Load (kg)</td>
<td>35 kg</td>
<td>90 kg</td>
<td>210 kg</td>
<td>250 kg</td>
</tr>
</tbody>
</table>

**Vertical Vacuum Furnace**

**VGQ/VPQ series**

<table>
<thead>
<tr>
<th>Model</th>
<th>VGQ-60/120</th>
<th>VGQ-60/120</th>
<th>VPQ-120/150</th>
<th>VPQ-120/150</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size (mm)</td>
<td>ø600 x 1200(H)</td>
<td>ø600 x 1200(H)</td>
<td>ø1200 x 1500(H)</td>
<td>ø1200 x 1500(H)</td>
</tr>
<tr>
<td>Temperature</td>
<td>Max: 1320°C / Working range: 540~1300°C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Load (kg)</td>
<td>1100 kg</td>
<td>350 kg</td>
<td>1300 kg</td>
<td>400 kg</td>
</tr>
</tbody>
</table>

**Multi Chamber Vacuum Furnace**

**GVQ series**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Size (mm)</td>
<td>ø200 x 200(H)</td>
<td>ø400 x 400(H)</td>
<td>ø800 x 800(H)</td>
<td>ø1200 x 1200(H)</td>
</tr>
<tr>
<td>Temperature</td>
<td>Max: 1320°C / Working range: 540~1300°C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Load (kg)</td>
<td>400 kg</td>
<td>400 kg</td>
<td>400 kg</td>
<td>400 kg</td>
</tr>
</tbody>
</table>

**Tempering Furnace**

**NVPT series**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Size (mm)</td>
<td>ø200 x 400(H) x 400(L)</td>
<td>ø500 x 500(H) x 500(L)</td>
<td>ø200 x 200(H) x 200(L)</td>
<td>ø200 x 200(H) x 200(L)</td>
</tr>
<tr>
<td>Temperature</td>
<td>Max: 700°C / Working range: 150~700°C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Load (kg)</td>
<td>180 kg</td>
<td>450 kg</td>
<td>800 kg</td>
<td>1300 kg</td>
</tr>
</tbody>
</table>

**Applications:**
- Quench-hardening, Tempering, Solution treatment, Aging, Annealing, Brazing

The advantages are:
- Effective processing of long dimension
- Excellent temperature uniformity;
- 360 degree arrangement heating elements
- Heating elements on top and bottom
- Top or Bottom Loading;
- Cooling gas pressure; variable High/Low pressure
- Clean and bright finish after treatment
Horizontal Vacuum Furnace

IHI offers various models of internal quenching vacuum furnaces enabling users to choose and handle various thermal processes for variety of materials. IHI has installed more than 1500 of these vacuum furnaces all over the world.

Applications:
- Quench-hardening, Tempering, Solution treatment, Aging, Annealing, Brazing

The advantages are:
- Excellent temperature uniformity;
  - By heating elements on top, bottom and both sides in chamber
  - 3 zones heating control
- Cooling gas pressure; variable High / Low pressure
- High pressure gas cooling system
  - Reduced cooling time
  - Enable to heat treat a wide variety of metals
- Cooling gas flow;
  - Bottom to top
  - Top to bottom
  - Top to bottom and Bottom to top

- Minimal distortion; Large gas flow guarantees uniform cooling pattern
- Clean and bright finish after treatment

<table>
<thead>
<tr>
<th>Load(kg)</th>
<th>Cooling pressure</th>
<th>Temperature</th>
<th>Size (mm)</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>35 kg</td>
<td>Max:1320°C / Working range: 540 ~ 1320°C</td>
<td>1300° C</td>
<td>400(W) x 400(H) x 1000(L)</td>
<td>VCH-161616</td>
</tr>
<tr>
<td>90 kg</td>
<td>Max:1320°C / Working range: 540 ~ 1320°C</td>
<td>1300° C</td>
<td>600(W) x 600(H) x 1000(L)</td>
<td>VCH-161624</td>
</tr>
<tr>
<td>250 kg</td>
<td>Max:1320°C / Working range: 540 ~ 1320°C</td>
<td>1300° C</td>
<td>1200(W) x 1800(H) x 1800(L)</td>
<td>VCH-243648</td>
</tr>
</tbody>
</table>

Vertical Vacuum Furnace

Applications:
- Quench-hardening, Tempering, Solution treatment, Aging, Annealing, Brazing

The advantages are:
- Effectively processing of long dimension
- Excellent temperature uniformity;
  - 360 degree arrangement heating elements
  - Heating elements on top and bottom
- Top or Bottom Loading;
- Cooling gas pressure; variable High / Low pressure

<table>
<thead>
<tr>
<th>Load(kg)</th>
<th>Temperature</th>
<th>Size (mm)</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>650 kg</td>
<td>a) 600 x 1100(H)</td>
<td>800 kg</td>
<td>VQG-60/120</td>
</tr>
<tr>
<td>500 kg</td>
<td>a) 650 x 850(H)</td>
<td>1000 kg</td>
<td>VQG-120/150</td>
</tr>
<tr>
<td>310 kg</td>
<td>a) 650 x 1200(H)</td>
<td>1300 kg</td>
<td>VQG-140/180</td>
</tr>
<tr>
<td>180 kg</td>
<td>a) 200 x 350(H)</td>
<td>1600 kg</td>
<td>VQG-200/350</td>
</tr>
</tbody>
</table>

Multi Chamber Vacuum Furnace

Applications:
- Quench-hardening, Tempering, Solution treatment, Aging, Annealing, Brazing

The advantages are:
- 3 chamber furnace;
  - Loading chamber
  - Heating chamber
  - Cooling chamber
- Low energy cost
- Excellent temperature uniformity;
  - By heating elements on top, bottom and both sides in chamber
  - 2 zones heating control
- Cooling gas pressure; variable High / Low pressure
- Clean and bright finish after treatment

<table>
<thead>
<tr>
<th>Load(kg)</th>
<th>Temperature</th>
<th>Size (mm)</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>450 kg</td>
<td>Max: 1320°C / Working range: 540 ~ 1320°C</td>
<td>ø1200 x 1800(H)</td>
<td>VGQ-120/150</td>
</tr>
<tr>
<td>1100 kg</td>
<td>Max: 2000 kg / Working range: 540 ~ 1320°C</td>
<td>ø2000 x 3500(H)</td>
<td>VGQ-200/350</td>
</tr>
</tbody>
</table>

Tempering Furnace

Applications:
- Tempering, Aging Treatment, Annealing

The advantages are:
- Bright treatment; Vacuum + N2 gas purge process
- Excellent temperature uniformity;
  - Excellent door tightness
- 360 degree arrangement heating elements
- Heating zones are individually controlled
- Heating, Convection and Vacuum heating
- Optional items; High vacuum operation / High temperature operation

<table>
<thead>
<tr>
<th>Load(kg)</th>
<th>Temperature</th>
<th>Size (mm)</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>370 kg</td>
<td>Max: 700°C / Working range: 150 ~ 700°C</td>
<td>ø850 x 1400(H)</td>
<td>NVPT-85/140</td>
</tr>
<tr>
<td>510 kg</td>
<td>Max: 1300 kg / Working range: 150 ~ 1300°C</td>
<td>ø1250 x 2000(H)</td>
<td>NVPT-125/2000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Load(kg)</th>
<th>Temperature</th>
<th>Size (mm)</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>450 kg</td>
<td>Max: 800 kg / Working range: 150 ~ 800°C</td>
<td>ø800 x 1800(H) x 1800(L)</td>
<td>NVPT-80/180/180</td>
</tr>
<tr>
<td>880 kg</td>
<td>Max: 4500 kg / Working range: 150 ~ 4500°C</td>
<td>ø1200 x 3000(H) x 3000(L)</td>
<td>NVPT-120/3000/3000</td>
</tr>
</tbody>
</table>
IHI developed a new vacuum carburizing system with Gas/Oil quenching for inline production and small quantity & large variety products.

Cleaning with IHI’s vacuum degreaser provides the best conditions for a uniform carburizing process, vacuum operations, gas nitriding and other heat treatments. IHI offers a range of vacuum degreaser in several sizes.

The advantages are:
- Excellent cleaning result using vapor/steam of solvent
- No emissions, integrated recovery and oil separation
- Less preventive maintenance
- Low infrastructure costs
- Clean and bright finish after treatment, cleaning deep holes and gaps
- Immersion, spraying, vapor cleaning and drying in one installation

IHI offers a new type vacuum degreaser with low energy consumption. Our “Cryo Drying System” reduces drying time during the cleaning process. An improved drying system removes solvent from parts surfaces. Immersion is not required, therefore fine amount of stored solvent can be reduced.

The advantages are:
- Short cleaning time with high cleaning performance
- Low energy consumption
- Less stored solvent
- Low operation costs

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<table>
<thead>
<tr>
<th>Number of chamber</th>
<th>Dimensions / Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 3 chambers</td>
<td>ø320 mm x h200 mm / 50kg</td>
</tr>
</tbody>
</table>
Vacuum Furnaces and Furnaces for Advanced Materials

IHI is one of the largest furnace manufacturers in the following industries.

More than 50 years experience and reliability

IHI has been sharing its expertise in furnaces to meet challenges in the above-mentioned areas for 50 years and contributing to customer's advanced technology.

Sophisticated Japanese Technology

As a market leader, IHI fulfills the high level and strict requirements from Japanese customers and provides 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 value for the customer by links up with our subsidiaries in the high-quality coating activities, IHI Ionbond AG and IHI Hauzer Techno Coating B.V.

Vacuum Carburizing Furnace VCB

IHI offers a full automated batch-type vacuum carburizing furnace with oil quench.

- High reliability
- Low maintenance time and costs
- Low infrastructure costs
- Preventing soot deposit build up by automated burn-off during operation
- Energy efficient and short treatment cycles using high temperature
- Clean and bright finish after treatment

Vacuum Carburizing Multi-Cell Furnace Low V-MALS

IHI offers a completely automated and integrated vacuum carburizing furnace line with oil quench.

- Temperature uniformity
- Low maintenance time and costs
- Low infrastructure costs
- Preventing soot deposit build up by automated burn-off during operation
- Energy efficient and short treatment cycles using high temperature
- Clean and bright finish after treatment

Sintering Furnace

IHI develops and manufactures sintering furnaces with ample experience of custom-made sintering furnaces.

Applications:
- Ceramic materials (2300°C), Cemented carbide, nickel-base alloys, and others (1600°C)

- The advantages are:
  - High heating performance and good temperature uniformity
  - High pressure gas cooling system
  - Optimum De-waxing system, cooling performance (3 modes)
  - High pressure gas heating
  - Selectable exhaust gas capacity
  - Cooling water circulation system
  - Atmosphere control (pressure control, H2 carrier gas)
  - High speed cooling system in the high temperature range

IHI offers a completely automated and integrated vacuum carburizing furnace line with oil quench.

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- Low infrastructure costs
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- Clean and bright finish after treatment

High Pressure Sintering Furnace

IHI is a top manufacturer of De-waxing high pressure sintering furnace that are consistently evaluated for safety and temperatures uniformity for high performance material.

Applications:
- De-waxing, sintering each step of sintered carbide alloys of tip drill, micro drill, die
- Pressure sintering of molded powder materials.

- The advantages are:
  - High safety
  - Optimal temperature uniformity
  - High speed cooling

Other products:

- Carbonizing furnace
- Graphitizing furnace
- Purifying furnace
- Furnace for carbon fiber (refurbishing furnace, carbonizing furnace, activating furnace)
- Furnace for carbon composite production

Vacuum Furnaces and Furnaces for Advanced Materials

IHI is one of the largest furnace manufacturers in the following industries.
The IHI Group

IHI Corporation was established in 1853 and since then we have been continuously contributing to the development and expansion of industrial technology in Japan and beyond. Currently, the IHI Group has over 250 affiliated companies worldwide and more than 26,000 employees.

Business areas

The IHI Group develops, manufactures, and supplies various products and solutions in the following four business areas:

- Resources, energy, and environment
- Social infrastructure and offshore facilities
- Industrial systems and general-purpose machinery
- Aero engine, space, and defense

Heat treatment and Surface treatment Technology

IHI installed the first vacuum heat treatment furnace in Japan for the aerospace industry. Later, thanks to synergy with industrial furnace technology, heat treatment has spread to various industries including automobile and construction machinery. Today, IHI supplies various heat treatment equipment and engages in the heat treatment process business. Furthermore, IHI introduced latest plasma coating technologies into PVD/TMDS coating and surface treatment equipment in the early 1990s, which have been utilized in various fields such as engine parts for automobiles and aircrafts.

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Furnaces for Advanced Materials
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