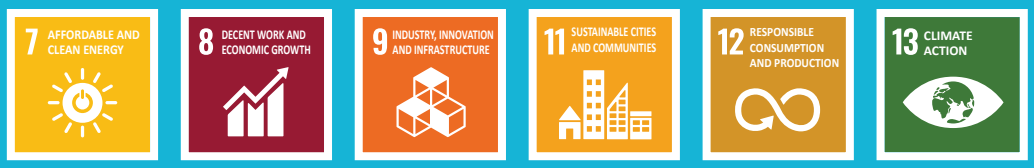
4 Product Innovation and Quality Management



Achievement of Short-, Medium-, and Long-term Plans and Goals for Material Topics Related to Product Innovation

Kaori is committed to product development and quality improvement and continues to create profitable growth with important goals: product R&D and innovation, ensuring patent R&D results, protecting trade secrets and legal compliance, product quality management, and assessing the market future of products. Short-, medium- and long-term metrics are as follows:

Timeline	Short-term metrics (2024 - 2025)	Medium-term metrics (2026 - 2029)	Long-term metrics (after 2030)
Product quality	• Pass the ISO 9001 Quality Management System certification every year • No violation of EU Restriction of Hazardous Substances Directive (RoHS) • No violation of REACH SVHC prohibition	• Pass the ISO 9001 Quality Management System certification every year • No violation of EU Restriction of Hazardous Substances Directive (RoHS) • No violation of REACH SVHC prohibition	• Pass the ISO 9001 Quality Management System certification every year • No violation of EU Restriction of Hazardous Substances Directive (RoHS) • No violation of REACH SVHC prohibition
Legal Compliance	0 cases of non-compliance with product laws or patent regulations	0 cases of non-compliance with product laws or patent regulations	0 cases of non-compliance with product laws or patent regulations

Material issue objectives and performance

Kaori is committed to product R&D and innovation, R&D patent achievements, product quality management, legal compliance, etc. The following table shows the degree of achievement of important goals and performance in the past two years:

- Product Quality Management

	2024 Performance Targets	Achieved in 2024	2025 Performance Targets
Brazed Plate Heat Exchanger Department	Pass the ISO 9001 Quality Management System certification every year	Pass the ISO 9001 Quality Management System certification every year → Achieved	Pass the ISO 9001 Quality Management System certification every year
Fuel Cell Business	• Pass the ISO 9001 Quality Management System certification every year • Pass the Aerospace Quality Management System AS9100 every year	• Pass the ISO 9001 Quality Management System certification every year → Achieved • Pass the Aerospace Quality Management System AS9100 every year → Achieved	• Pass the ISO 9001 Quality Management System certification every year • Pass the Aerospace Quality Management System AS9100 every year
New Business Development - Hydrogen Power	Pass the ISO 9001 Quality Management System certification every year	Pass the ISO 9001 Quality Management System certification every year → Achieved	Pass the ISO 9001 Quality Management System certification every year
New Business Development - Thermal Energy	The Ziqiang Plant began operations in July 2023 and is expected to implement the ISO 9001 Quality Management System in 2025.		

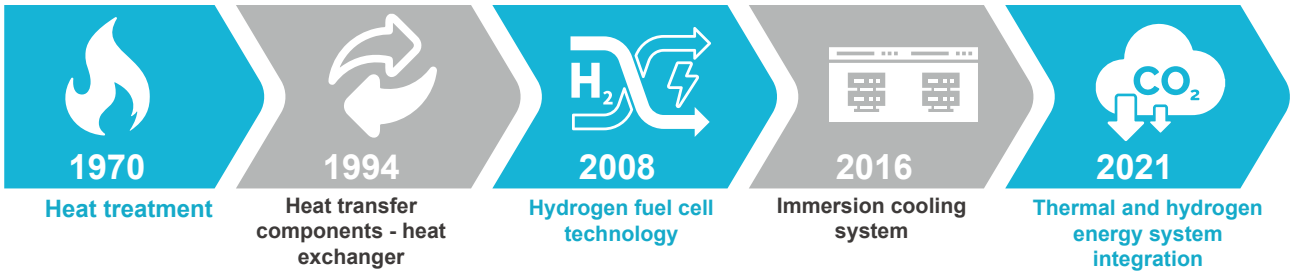
- Compliance

2024 Performance Targets	Achieved in 2024	2025 Performance Targets
0 cases of non-compliance with product-labeling laws or patent regulations	0 cases → Achieved	0 cases of non-compliance with product-labeling laws or patent regulations

4.1 Development of innovative products

Material issues	Management Approach
Innovative R&D	**Policy** Explore new application areas and develop low-carbon green energy solutions based on the Company's core technologies. **Goal** To protect the Company's intellectual property, enhance product competitiveness, enhance the quality of patents, and optimize the Company's intellectual property management and operations. **Commitment** Actively improve production technology and production capacity scale, maintain the Company's manufacturing cost advantage, and enhance overall production and marketing competitiveness. **Measures** 1. Established a "Patent Review Committee" composed of R&D managers, business unit managers, and legal/intellectual property managers. 2. Develop a "Patent Application and Incentive Policy" to encourage employees to focus on innovation and research. 3. Explore energy-saving solutions for the vacuum furnace, a key piece of production equipment, to reduce the production process's carbon emissions. 4. Introduce ISO 14067 for product carbon footprint to grasp the status of life cycle carbon emissions and formulate reduction plans. 5. Strengthen employee on-the-job training and actively recruit outstanding talents externally.

Kaori prides itself for being able to persistently innovate and support the industry's transition to net zero emissions.



Four core business units: Fulfill the United Nations Sustainable Development Goals (SDGs)

Heat Exchanger Business Unit

Fuel Cell Business Unit

Hydrogen Energy Business Unit

Energy Management Business Unit

4.1.1 Sustainable products and services

Brazed Plate Heat Exchangers

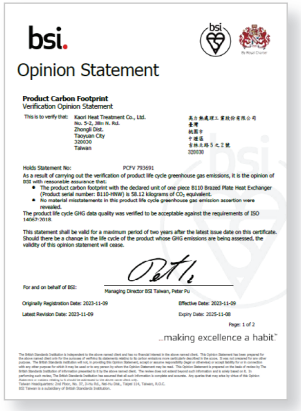
Featuring wave patterns stamped on 304 or 316 stainless steel materials, Kaori's brazed plate heat exchangers are made through multi-point brazing of stainless steel with copper or nickel in a vacuum furnace, thereby allowing them to operate under extreme pressure in a very small chassis while making them especially suitable for refrigeration and air conditioning systems. Meanwhile, the wave patterns stack on top of each other to form conduits that create a turbulent flow of the coolant even at low flow speeds. This enables the heat exchangers to achieve high thermal conduction efficiency in a small heat transfer area. In systems that require high efficiency, the use of brazed plate heat exchangers may further increase the coefficient of performance (COP) and reduce the overall space needed to install the modules, which in turn lessens the need for fluorinated greenhouse gases (F-GHG) and is a more efficient and environment-friendly design.

Industry Applications

•Air conditioning •Semiconductors and electronics •Refrigeration •Energy and utilities •Machinery •Transportation •Medical equipment •Data centers

Sustainable Development Highlights

- The first heat exchanger manufacturer in Taiwan to pass ISO 14067 carbon footprint third-party inspection.
  (The certificate is shown on the right)
- Digitalization of product manuals.
- Continue to develop low-carbon stainless steel in a diversified manner, which can reduce carbon emissions by 95%.
- Assist overseas customers in obtaining local quality certification.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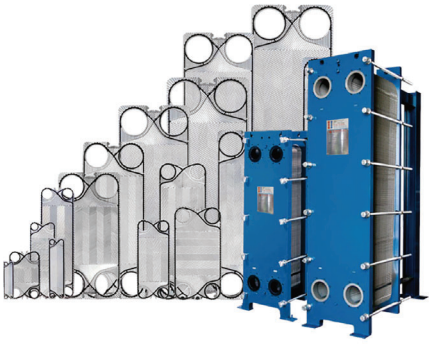
Opinion Statement

Product Carbon Footprint
Verification Opinion Statement

...making excellence a habit.



Gasket Plate Heat Exchangers

Offers better heat conduction in a smaller size compared to spiral type or shell and tube type heat exchangers. With proper design, gasket plate heat exchangers can be more efficient at transferring heat and easier to clean, maintain, disassemble, and install while retaining the potential for capacity expansion.

Industry Applications

•Petrochemical plants •Oil refineries •Steel •Power generation •Freight •Semiconductors •Metal processing •Food •Refrigeration

Sustainable Development Highlights

- Energy efficiency and conservation:

  The special pattern design enables a high level of turbulent flow even at low flow speeds, therefore delivering a number of advantages including efficient heat transfer, reusability, and a longer lifespan of at least 10 years.

- Heat recycling:

  Data centers, for example, may use a combination of immersion liquid cooling and gasket plate heat exchangers to recycle heat and increase overall energy efficiency by more than 40%.

Critical SOFC Components
High-efficiency Fuel Cell Recuperators

Heat-resistant nickel-base superalloys are assembled using Kaori's proprietary brazing technology in conjunction with advanced TIG welding to allow heat transfer under high temperatures. The material achieves a thermal cycle efficiency of 60%. This demonstration of exceptional brazing and TIG welding techniques has gained recognition from green manufacturers worldwide and made Kaori a long-term strategic partner.

Industry Applications

A solid oxide fuel cell (SOFC) is a form of distributed energy system which involves generating and supplying power directly to local users based on their requirements. Kaori's solutions offer a high degree of versatility that make them suitable for medium- and small-size energy conversion systems of various purposes. Ships, for example, may install fuel cell power systems to replace diesel power.

Sustainable Development Highlights

- Advantages such as high performance, stability, low emissions, zero pollution, waterless, and long lifespan have been validated through commercial operation by reputable customers for more than 10 years.
- Thermal reactors for high capacity SOFCs increase power generation efficiency to 65% from the previous generation.
- Thermal reactors have been developed for hydrogen generation and energy storage.
- Application in vessels helps the shipping industry achieve energy and carbon reduction goals.

Reformed methanol/hydrogen PSA system

The hydrogen generator takes in a methanol solution and applies a process called pressure swing absorption (PSA) to purify and generate high-purity hydrogen (99.999%). It is widely used in industrial processes that make use of the gases generated, such as hydrogen reduction furnaces, heat treatment furnaces, semiconductors, and optoelectronics.

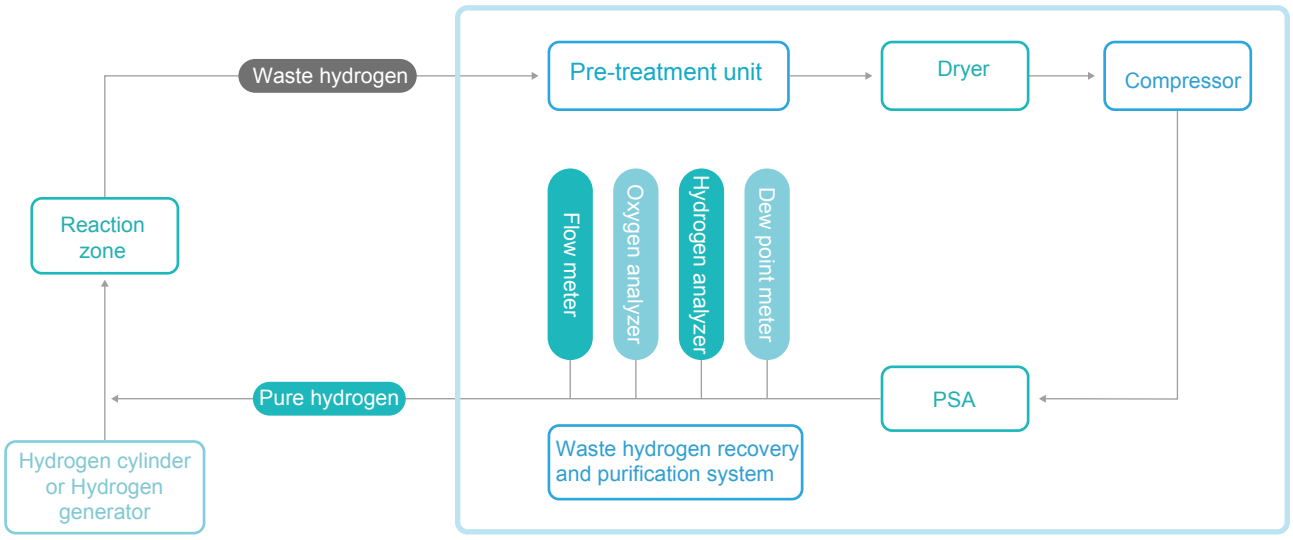
- 30-4.5 m^3/hour
- Generates hydrogen at low pressure (<5 kg/cm^2) with rigorous safety protection
- Uses methanol (<59%) as the raw material; the hydrogen produced can be used immediately and does not require a hydrogen storage tank
- Replaces pressurized hydrogen canisters; equipment investments can be recovered in as little as six months

Reformed Methanol/Proton Exchange Membrane (PEM) Fuel Cell System/Ammonia Fuel Cell (AFC) System

- System size is 30-50% smaller compared to products of equivalent grade
- Energy consumption ≤ 0.5 kW and noise ≤ 65 dB (at 5 kW output)
- CO emission ≤ 20 ppm (low exhaust; no NOx and SOx)
- Safe and stable: Overall power and thermal efficiency >85%; continuous operation for >72hr
- Applications: Backup power for remote areas or disaster sites; reserve power for critical facilities

Industrial Waste Hydrogen Purification/Recycling System

- Recycling and reuse: Eliminates the need to remove hydrogen or transport hydrogen in pressurized form; approximately 70% is recycled, which lowers carbon emissions
- Greatly reduces the need to supply hydrogen through tankers/canisters; can be replaced with Kaori's methanol hydrogen generators
- Recovery period of equipment investment is about 2.5 years



Organic Solvent Hydrocracking System

By treating organic solvent waste, hydrogen can be recycled and reused to generate base load power. Waste silicon from semiconductors and solar panels can be processed to produce hydrogen at 99.9% purity; using Kaori's purification system, the level of purity can be increased to 99.999%, which makes the hydrogen usable for industrial and power generation applications.

Industry Applications

- Supports hydrogen-based production procedures or by-product hydrogen: For example, hydrogen reduction furnaces, heat treatment furnaces, semiconductors, optoelectronics, powder metallurgy, metal wires, and steel industries.
- Organic solvent waste fluids of the electronics industry (semiconductors, circuitry, LCD panel, etc.) can be pre-processed and cracked at high temperature to separate hydrogen for power or heat.

Sustainable Development Highlights

Ammonia cracking and hydro power: Clean energy research involving the use of ammonia as hydrogen fuel carrier has gained popularity around the world in recent years due to the ease of storage, ease of transportation, and better economic viability of ammonia compared to hydrogen.

Liquid Cooling System

The Thermal Energy Business Unit focuses on AI data centers and has introduced a new generation of server liquid cooling products targeting “server thermal management”. These solutions align with current trends in AI development and provide more sustainable cooling solutions for data centers and high-performance computing.

Industry Applications

Cloud services/5G communication, Edge computing, Data centers, Semiconductor EDA, Artificial intelligence, Blockchain, Cryptocurrency (mining), Electric vehicle battery cooling

Sustainable Development Highlights

- Power usage effectiveness (PUE) is an internationally accepted metric for measuring the power efficiency of data centers. PUE is calculated by dividing the total data center power draw by the total IT equipment power draw. A low PUE indicates that the data center requires less power for cooling, which suggests lower power consumption and greater environmental friendliness.
- China's first data center with 5A green rating uses single-phase immersion cooling technology with insulated coolant to achieve high-efficiency cooling without the need for fans, air conditioners, or chillers. The solution reduces power used in cooling by 70% and lowers the PUE to 1.09.

4.2 Strategic Goals for New Products and Technologies

Kaori has implemented several strategies to address global climate change and align with corporate transformation efforts. The Company continues to research and develop green, sustainable products. The policies and management approaches for related products are as follows:

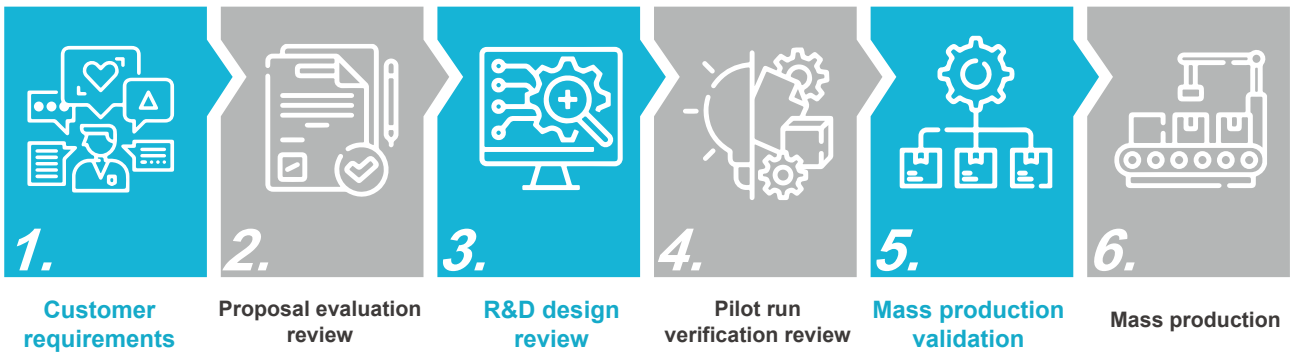
Material issues	Management Approach
Sustainable Products	**Policy** Research and develop low-carbon, green energy sustainable products in the field of innovative technology applications to meet future customer needs **Goal** Leverage collaboration with customers and suppliers to effectively utilize external resources and establish industry-academia partnerships. This diverse approach will guide the future planning of sustainable products and enhance the added value of the Company's products **Commitment** Plan and enhance the added value of products through due diligence and early warning communication methods, effectively increasing the Company's profitability and enhancing the overall competitiveness of production and sales **Measures** 1. Established a "Patent Review Committee" composed of R&D managers, business unit managers, and legal/intellectual property managers. 2. Develop a "Patent Application and Incentive Policy" to encourage employees to focus on innovation and research. 3. Introduce the ISO 14064-1:2018 for greenhouse gas inventory to identify high carbon-emitting equipment or processes and effectively reduce carbon emissions. 4. Introduce ISO 14067:2018 for product carbon footprint to grasp the status of life cycle carbon emissions and formulate reduction plans. 5. Strengthen employee on-the-job training and actively recruit outstanding talents externally.

Collaborative Development

- Technology Development Procedures:

  Kaori actively gathers the voices of customers and involves customers in the early stage of product development as a way to continually improve product creativity, design, and technological capacity. These involvements are useful for gaining insights into customers' core requirements, so that the Company can focus its development efforts on solving customers' problems. It has been a key factor to the success of the Company's product and technology development efforts. Customized solutions currently take up the majority of Kaori's development resources. As national policies and industry standards evolve, the Company will be able to introduce standardized product development processes and automated production lines.

- Standard product development procedures:



Brazed Plate Heat Exchangers

1. For the growing heat pump market, Kaori will introduce asymmetric flow design into different models to support a greater range of heat pump applications, thereby reducing the use of both natural and HFO coolants while increasing equipment COP.
2. More attention will be directed to improving the plate pattern design for optimal flow resistance, which increases heat exchange efficiency in less surface to achieve better performance.

Hydrogen Power Clean Energy

1. Kaori cooperates with customers on various projects to increase product performance and is committed to promoting hydrogen power circular economy, so that customers may realize the energy and carbon reduction potential of SOFCs.
2. Hydrogen application is an important step to reducing carbon. Kaori hopes to first demonstrate the viability of the technology within the domestic market, and then export whole systems over the medium and long term while placing emphasis on the development of the hydrogen supply chain and potential applications on a global scale to create a new industry altogether.
3. Kaori is exploring ways to use hydrogen power for carbon reduction using existing resources and the foundation of the industry. Attention will be paid to using zero/low-carbon fuel and scaling the production of green hydrogen and blue hydrogen as means to achieve carbon reduction goals.
4. Fuel cells are the mainstream solution of the future. They will grow in popularity in household use and backup power over the short term and make their way into cogeneration over the long term.

Liquid Cooling Technology

1. Engage critical CPU/GPU partners in more in-depth collaboration
2. Seek technology certifications with server manufacturers

Industry-Academia Partnerships

- Industry-academia collaboration:
  1. Kaori cooperates with National Central University and National Yang Ming Chiao Tung University to simulate and optimize the flow field and heat transfer within plate heat exchangers. A simulation model was developed in 2021 based on research data, and simulations on single-phase flow field were completed and validated in 2022. Kaori expects to progress into the simulation and validation of vaporization and condensation in two-phase heat transfer between 2023 and 2024.
  2. In 2022, Kaori cooperated with National Yang Ming Chiao Tung University on a study commissioned by the Ministry of Science and Technology titled “Experiment and analysis of two-phase flow data in brazed plate heat exchangers”, in which the researchers simulated and validated heat transfer in a two-phase flow setup in an attempt to improve the accuracy of measurements.
  3. In 2022, Kaori cooperated with National Central University on the study of boiling heat transfer in hybrid pattern plate heat exchangers, in which the researchers used different methods of flow resistance to increase the evenness of the boil.
  4. With regards to the optimization of new coolant systems, Kaori expects to test and determine a segregation design that achieves optimal distribution using different flow resistance in 2023, which will help improve the efficiency of plate heat exchangers.

- Professional talent:
  Development of liquid CDUs for vertical-type and horizontal-type cloud data server cabinets requires professional knowledge in heat flows, mechanical engineering, and system control. Kaori was able to acquire seven R&D employees possessing the above expertise in 2021, two in heat flows, three in mechanical engineering, and two in system control.

- Intensive training:
  Kaori invites professors from National Yang Ming Chiao Tung University and National Central University to organize professional courses according to product development needs.

- Professional associations:
  Kaori assigns R&D personnel to take part in forums organized by the Taiwan Thermal Management Association and the Cloud Computing & IoT Association on a regular basis, so that they can keep up-to-date with industry trends and obtain the latest information.

Future Development Plans

Plate heat exchangers

- Heat exchangers for fuel cell-related applications
- Heat exchangers for fresh water supply
- Heat exchangers for heat pumps
- Electric vehicle battery cooling modules and heat pumps/exchangers

For some of the above projects, the department will work with suppliers to develop materials and brazing alloys, and it will take advantage of the special characteristics of new materials to resolve issues when used in certain industries. For one of the projects above, the department will cooperate with a customer on a special design to improve heat pump efficiency, increase COP, and lower coolant requirements.

Hydrogen Power Clean Energy

- Thermal reactors for high-capacity SOFCs
- Thermal reactors for hydrogen generation
- Development and validation of pre-processing, cracking, and purification systems for hydrogen generation from industrial organic solvent waste
- Clean energy research involving the use of ammonia as hydrogen fuel carrier

Immersion liquid cooling systems

Cooperate with server manufacturers and upstream parts suppliers for product validation

4.3 Research and development of professional technology

2024 R&D Program Development Status

Program Name: Development of hydrogen production and carbon capture equipment from natural gas pyrolysis	
R&D Period	• From Q4 2023
Research Purpose	• Develop pyrolysis reactors and corresponding systems. • Reduce energy consumption
Research Content	• Develop an appropriate 4 Pyrolysis method to precipitate and concentrate solid carbon during the hydrogen production process to prevent the formation of CO or CO_2
Current progress (research results)	• Established testing system for catalysts • Forms of basic reactors already built
Whether a patent name has been obtained	• In 2024, the Company was granted R.O.C. Patent No. I858788 for a “Carbon Dioxide Fixation Device”

Program Name: Development of Inspection Technology for Brazed Joints in SOFC Recuperator Fin Structures

Awarded the Outstanding Achievement Award at the 2024 Industry-Academia Collaboration Project Presentation by the Department of Engineering and Technologies, National Science and Technology Council

4.4 Achievements in trade secret protection

Kaori understands that trade secrets are the key to the industry's sustainable development. In addition to taking protective measures to actively defend trade secrets, Kaori complies with the ISO 9001 "Technical Secrets Documentation Management Method" and "Document and Record Management Procedures" to implement the management system's responsibilities and maintain industrial competitiveness.

4.5 Quality management

Material issues	Management Approach
 Product quality	Policy Quality excellence at reduced costs. Timely delivery and satisfied customers Goal Offer safe and reliable products and services in conformity with customers' needs and the requirements of applicable laws Commitment To establish preventive control, minimize negative impacts, and use a process-oriented approach to enhance the effectiveness and efficiency of departmental processes Measures 1. Comply with ISO 9001:2015 quality management system and pass certification every year 2. Comply with AS9100:D Aerospace Quality Management System and pass the certification every year 3. No violation of EU Restriction of Hazardous Substances Directive (RoHS) 4. No violation of REACH SVHC prohibition

Kaori has developed its own quality management system in accordance with ISO 9001:2015 Quality Management System and implemented a series of management procedures and operational guidelines to guide quality management practices throughout the Company. Furthermore, Kaori has open communication channels in place to gather customers' opinions, quality feedback, audit findings, etc., for ongoing improvements. The Company will continue listening to customers' voices and adopting total quality management to satisfy customers' needs.

All of the Company’s business units were certified under the latest international quality management system, ISO 9001:2015, in 2020. In addition, the Fuel Cell Division obtained certification for the latest aerospace quality management standard, AS9100:D, in February 2022. These certifications guide the Company in its continuous improvement efforts, enabling the delivery of the most reliable quality and services to customers. Kaori remains committed to its customer-centric service philosophy and refrains from all actions that compromise product quality or endanger customers' safety. By making quality a part of our corporate culture and employees' conviction, we strive to become customers' trusted partner and work with customers and suppliers toward sustainability.

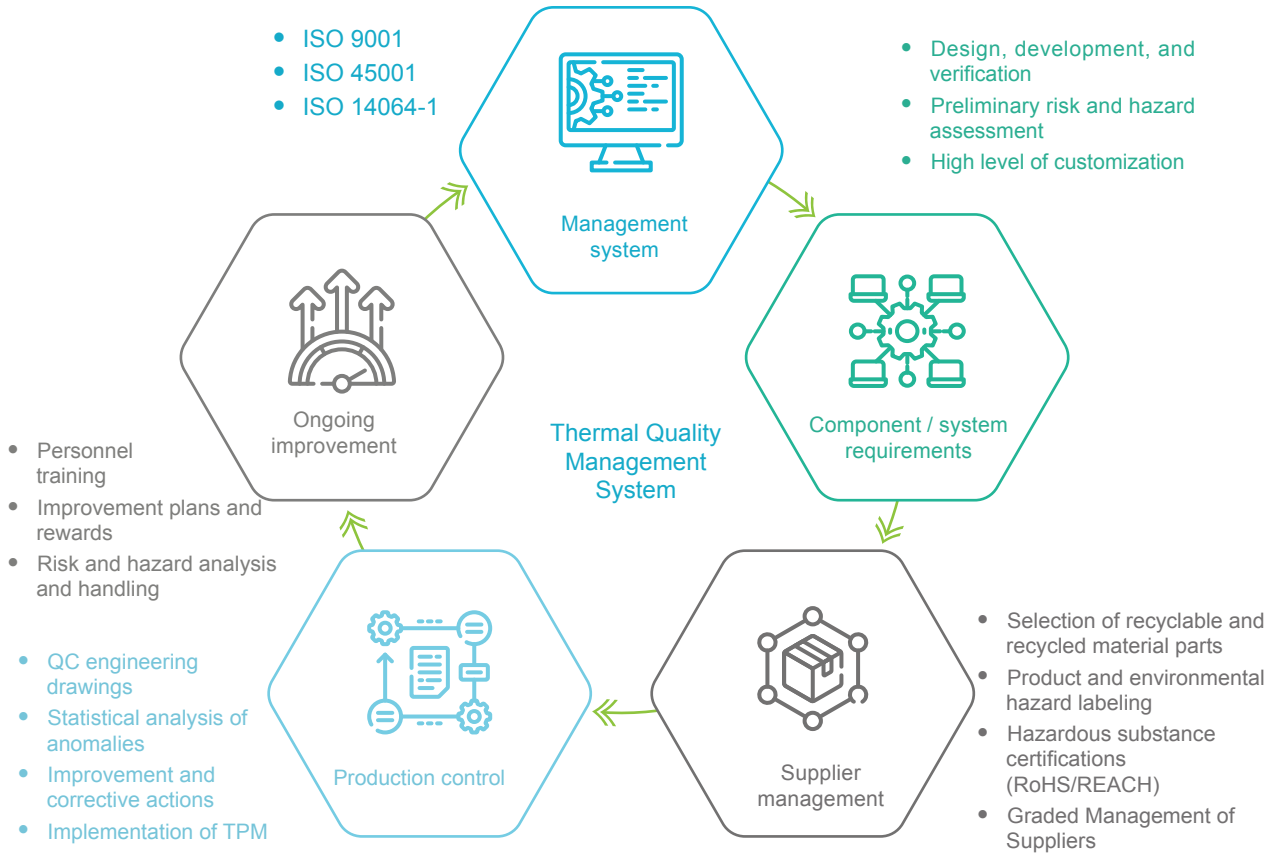
The Company encountered zero instances of product recalls due to safety concerns or otherwise in 2024 and suffered no financial losses from lawsuits concerning product safety.

Quality Management Procedures

To ensure the quality of its products and services, Kaori adopts the process-oriented approach of the International Organization for Standardization (ISO) to improve the quality performance of various departments. By implementing the Plan, Do, Check, and Act (PDCA) cycle, the Company continues to optimize its processes and enforce preventive control with a risk focus.

- Process-oriented approach:
  From order taking, production, inspection, and shipment, Kaori applies standardized procedures and delivers products and services to customers' satisfaction.
- PDCA:
  Ensure that every process is supported with adequate resources and is properly managed and improved upon on an ongoing basis.
- Risk perspective:
  Adapt to changes in the internal and external environments, minimize probability of decision errors, and prevent possible losses; aim for total anticipation of opportunities and risks, and perform effective damage control after the occurrence of risk events for business continuity.

New Business Development - Thermal Energy Quality Management System



Fuel Cell Business - Quality Management System

Promotion of Quality Awareness

Quality awareness is defined as how the employees, leaders, and managers of a business perceive and act in relation to the quality of their offerings. It is a common language that employees use to communicate in daily work activities, a value that inspires our behavior to the outside world, and a standard by which we measure our performance. By changing how employees perceive the work they do from within, we help them develop proper habits, which in turn contributes to the further strengthening of the quality culture.

Quality is key to the continuity of a business. It requires contribution from all employees and takes persistence in making improvements in order to satisfy customers' needs and accomplish corporate targets. There are also many aspects to quality, and under-performance in any aspect will compromise customer satisfaction and threaten business survival.

The Company holds the conviction that workforce competence is critical to the quality of products and services offered. Through education and training, the Company aims to develop strong quality awareness and consistent quality goals across employees. Kaori organizes a variety of training courses to improve the quality of products and services provided; progress for 2024 is summarized below:

- 100% of new recruits passed general knowledge training
- 100% of employees completed training for ISO 9001, AS9100, and ISO 14001 quality systems
- 100% of employees completed specialist training; training courses were organized to educate employees on instrument calibration, ionizing radiation protection, legal requirements, etc., and to qualify those that require professional certification.

Quality Assurance

To bring traceability into the products manufactured, Kaori has adopted an enterprise resource planning (ERP) system and a manufacturing execution system (MES) that digitally integrates all processes from material purchase, storage, production, and quality management to financial management. These systems record the details of every production stage and ensure that accurate data can be generated quickly to support Kaori's commitment to quality assurance.

1. Site Management
2. Safety management: 5S activities

SEIRI

Separate useful items from useless items, and dispose of useless items.

SEITON

Place useful items neatly and in the appropriate quantity, and label clearly.

SEISO

Clean the workplace and prevent pollution.

SEIKETSU

Implement standards and rules for the 3S above, and enforce accordingly to deliver results.

SHITSUKE

All members of the organization shall follow rules and develop proper habits.

Operations management

1. Standardized operations: standard operating procedures.
2. Skill training: skill training and evaluation; skill evaluation standards, skill development program, and skill training standards.
3. Improvements: A suggestion system has been implemented to encourage improvement plans for accomplishing business goals.

Quality management

1. Management during normal circumstances: Quality assurance standards have been implemented for operational staff and managers.
2. Responses in the event of abnormal occurrences (whether discovered internally or externally): The Company has standard responses in place to respond to abnormal occurrences of which all employees have been made aware.

Equipment management

Total productive maintenance (TPM): includes equipment inspection standards, inspection charts, inspection cycles, responses to equipment malfunction, and training materials for operators (work commencement checks, inspection standards, training data, etc.).

On-Site Education and Training

1. On-site education: Kaori highlights and discusses abnormal issues in daily morning meetings and takes improvement measures and follows up on progress afterwards
2. Special-purpose training: abnormal occurrences are analyzed and shared internally as case studies
3. Specialist training: instrument calibration, internal audit, pre-brazing preparations, post-brazing test, incoming quality control (IQC), final quality control (FQC), etc.

Quality Improvement Highlights for 2024

Kaori encourages all employees to participate in making persistent improvements and promotes quality awareness as a way to unite and motivate employees. An incentive program called “Quality Improvement Proposal” has been implemented to guide and encourage employees toward innovative thinking. The program invites all employees to contribute new ideas on ways to improve quality and business management, whether in terms of processes, products, or the organization, so that the organization can strive toward excellence and ensure continuity.

Brazed Plate Heat Exchanger Department

In 2024, a total of 9 improvements were made.

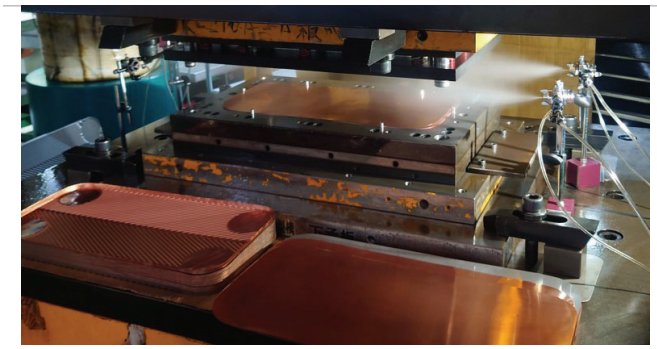
Improvement Highlight (1): Automatic Oil Spraying System for Stamping Machines

Purpose Process optimization to reduce motion waste, which is one of the seven wastes in production, and to standardize operations for improved quality.

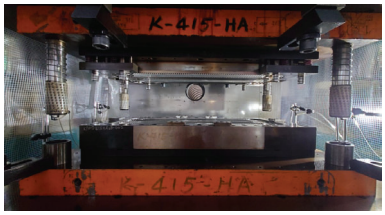
The status before improvement

Manual oil spraying using a hand-pressed oil can

- Inconsistent oil spray position and volume tolerance, resulting in longer operation time
- Oil spray position is limited due to single-side operation by personnel at the stamping machine



↓ Ongoing improvement ↓



The result after improvement

Automatic oil spraying by equipment

- Oil spray position and volume are both quantifiable and controllable, improving quality.
- Shorter operation time, enhancing equipment utilization rate.

Ongoing improvement

Added oil mist recovery device

- Oil mist is generated during the spraying process; therefore, an optimized recovery mechanism was added.
- The addition of a protective cover helps reduce dust contamination on the stamping machine. (Complies with 5S cleaning standards and prevents contamination)
- Recovered oil mist can be reused, promoting environmental friendliness and contributing to energy saving and carbon reduction.

Improvement Highlight (2): Load Limit Alarm for Vacuum Furnace Pressing Machine

Purpose Error-proofing, labor-saving, and quality enhancement.

The status before improvement

Manual visual inspection used to determine total furnace load,

- Different equipment has different weight limits, previously judged manually by visual inspection to determine whether overweight.

The result after improvement

Warning lights indicate when the load exceeds the limit

- Reduces the risk of human error
- Easy to read and ergonomically designed, eliminating the need to bend over.

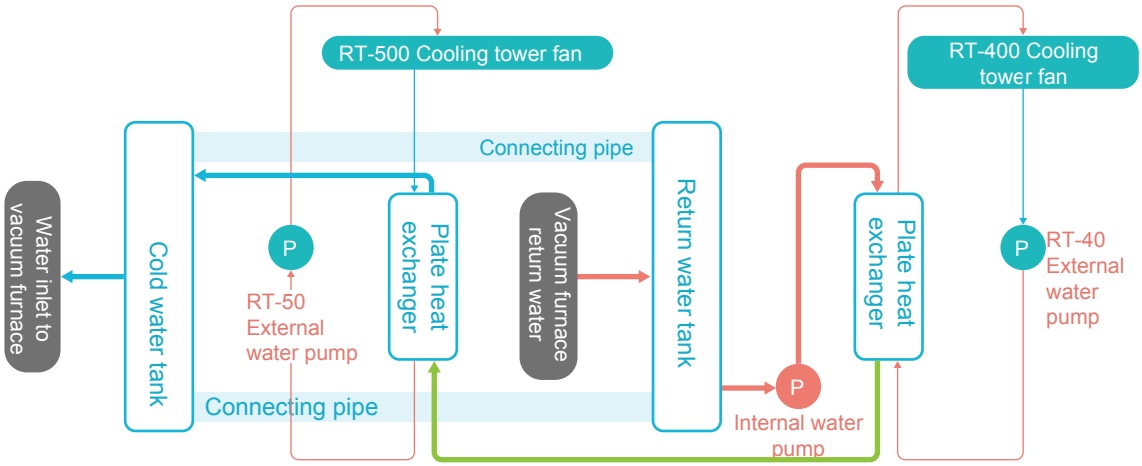
Improvement Highlight (3): Energy Optimization Proposal for the New Water System of Vacuum Furnace VA16-23

Purpose Environmentally friendly, energy-saving, and carbon-reducing measures to lower costs and enhance competitiveness.

The status before improvement

Continuous operation upon startup

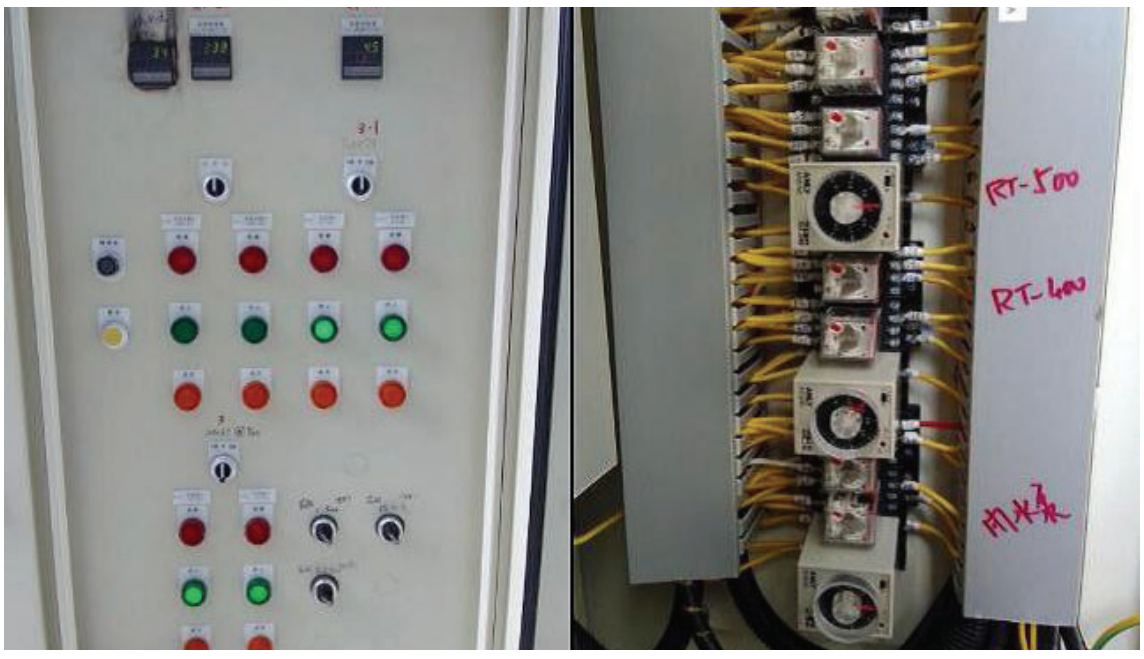
- The water circulation system for the auxiliary equipment of the vacuum furnaces was originally triggered as long as any one of VA16 to VA23 was activated.
  - Pumps began running immediately upon system startup
    - Internal water pump 75HP 55KW*1 • External water pump 75HP 55KW*1
    - Cooling tower circulation fan 15HP*222KW*1



The result after improvement

Automatically operates only when the temperature reaches 38°C

- Uses water tank temperature to control the start and stop of internal and external water pumps.
- Non-continuous operation enables power saving and reduces equipment wear.



Fuel Cell Business

In 2024, a total of 25 improvements were made.

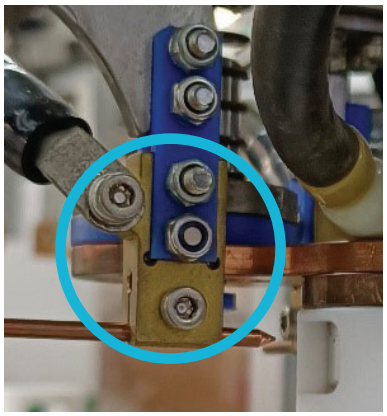
Improvement Highlight: Automated Assembly Machine - Desoldering Issue Improvement

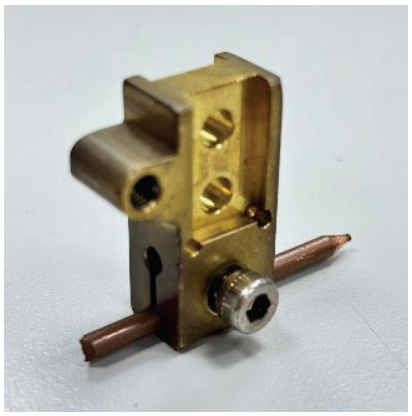
Purpose

1. To reduce defect rates and improve production efficiency.
2. To address two of the seven major production wastes: 1. Motion waste and 2. Waiting waste.

The status before improvement

- The clamping arm of the copper rod fixture was too short to secure the rod effectively, resulting in a welding defect rate of approximately 10% to 30%.
- Copper rods required frequent replacement and calibration, approximately every 200 pieces produced, with each replacement taking about one hour.





The result after improvement

- Improved fixture design by extending the lever arm to effectively secure the copper rods. Among nearly 70,000 products, the defect rate due to abnormal desoldering dropped to 0.76%.
- Replaced the original fastener with a butterfly screw tightened from bottom to top. This allows for quick replacement of worn copper rods in confined spaces without the use of tools.