



Thermal One-stop WELCON

Creation of novel structure by bonding technology, which will lead to create novel function.

Company Profile

Company Profile	WELCON Inc.
Location	Headquarters: 3640 Yashiroda, Akiha-ku, Niigata City, Niigata 956-0113 Yashiroda Factory No.2: 15-1 Yashiroda, Akiha-ku, Niigata City, Niigata 956-0113
TEL/FAX	Headquarters: TEL: 0250-38-1900 Yashiroda Factory No.2: TEL: 0250-47-7077
WEB	https://www.welcon.co.jp/en/
Established	July 2006
Capital	219.36 milion yen
Representative Director	President Yutaka Suzuki
Main business	①Technology development related to diffusion bonding ②Manufacture and sale of self-developed products ③Diffusion bonding contract processing

President message

Aiming for a safer and more comfortable life, various devices, systems and services are being proposed one after another. At the same time, the amount of energy consumption has been increasing, which has been continuously causing environmental problems. I dare say that we are beginning to notice its seriousness. We are currently working to realize a sustainable society by developing thermal countermeasure products having features such as heat cooling and soaking, heat exchanging and reacting, unprecedented product developing and its offering. So far we have realized features of high performance, miniaturization, energy saving, multi-functionality, and high withstand voltage of products by the fine three-dimensional structure by means of diffusion bonding technology.

Although it is still a small company now, we've been actively engaged in research, analysis, and evaluation. Our basic principle is that "We'll try if it sounds good idea", which drives ourselves to pursue creating new value. Also, we always keep in mind to check theory and practice with our own hands and eyes. It might be quite natural that solving problems have its own difficulties, but meanwhile, we would like to aim for goals where both our users and us (the maker and creator) are pleased with them. We will continue to run the company toward a higher plateau of happiness to share everyone.



President Yutaka Suzuki

Management Philosophy

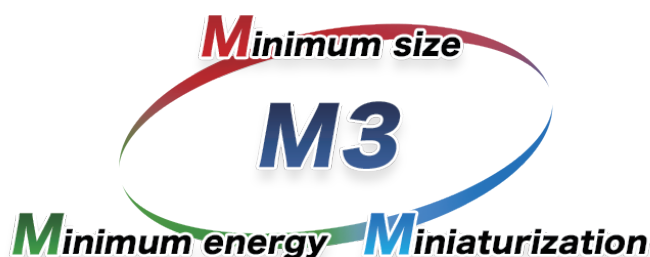
1. **Contributing to the development of society through technological innovation**
2. **Enjoy creating, pursuing change and discrimination**
3. **Customers, business partners, suppliers and employees are all pleased**
4. **Give hope to the region and contribute to revitalization**

Award history

May 2010	Received "Mitsui Precision Technology Award" from Japan Society for Plastic Processing
April 2014	Received "Excellent Product Award" from the Japan Society of Mechanical Engineers
December 2015	Received the 49th Good Company Award "New Technology Commercialization Promotion Award"
November 2020	Received the "Technology Award" from the Governor of Niigata Prefecture in the 2nd year of Reiwa
May 2021	Received the "38th Prefectural Economic Promotion Award" from Niigata Prefecture

Development concept: M3

M3 thermal countermeasure solution utilizing diffusion bonding, becoming a top manufacturer in providing M3 products



① **Minimum size**

Pursuing a small size

② **Minimum energy**

Pursuing energy saving of products and systems

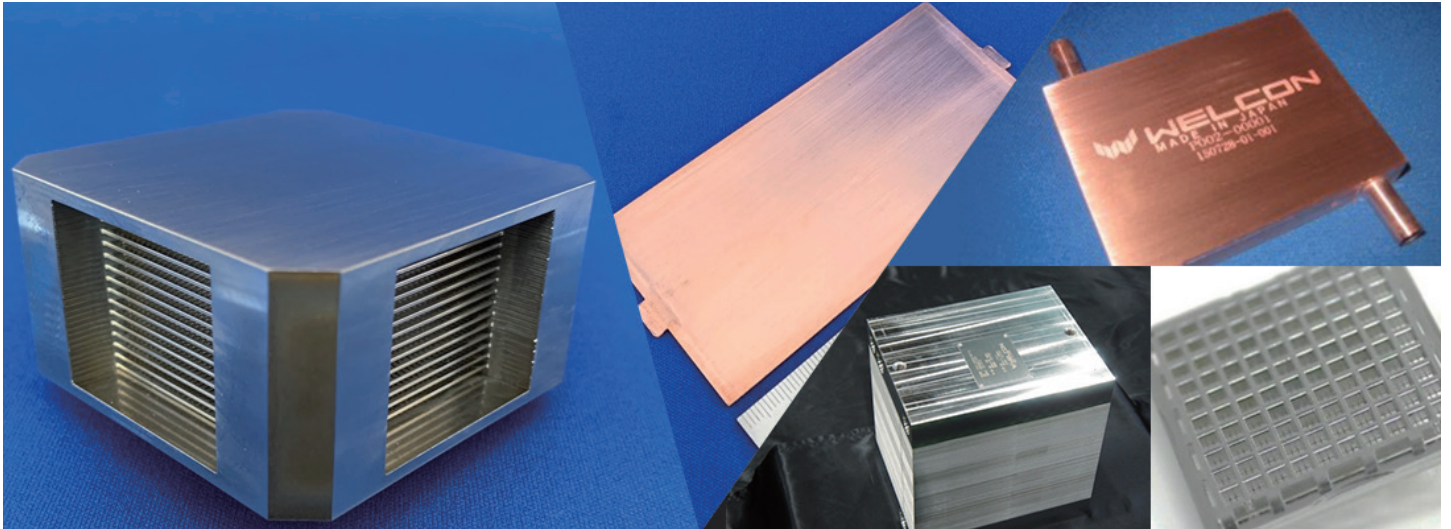
③ **Miniaturization**

Pursuing new features with a fine structure

We will provide solutions based on our development concept of "M3", applied not only to the size and performance of the product but also its production with as less energy as possible.

Products

Product line-up



Technical features

WELCON's core technologies are twofold. One is design / development technology related to "structure / thermal control" , and the other is manufacturing technology called "diffusion bonding". We have accumulated results from prototype development to mass production by applying their technology.

WELCON's products have a fine flow path structure called "microchannel". WELCON utilizes the technical know-how of design and development of microstructures, and are pursuing to embody novel performance and novel functions that have never existed before. WELCON implements fine structures in products by diffusion bonding. Diffusion bonding makes it possible to manufacture products with a three-dimensional hollow structure that are difficult to manufacture by ordinary machining.

Product features

- ▶ **The fine structure gives out products novel performance that was not found in conventional products.**
- ▶ **these products have precise design and manufacturing know-how such as control of plastic deformation.**
- ▶ **They do not require brazing materials and have high pressure resistance, corrosion resistance, and repeatability.**

About standard products

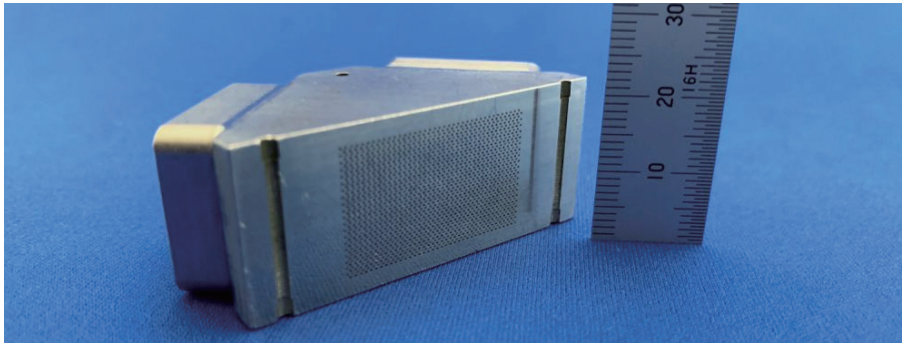
We can provide "standard products", for example heat countermeasure parts such as heat exchangers and heat sinks. They are packed with the know-how of WELCON, which has been advancing as a R&D company from the beginning. Regarding the price, the unit price varies depending on the number of orders. Please contact us for stock support.

About custom-made prototype development

In the case of standard products specifications, if the size and shape are different, or if the required performance is not satisfied, we can "customize the standard products " and "develop a prototype from scratch" according to the customer's specifications.

Products

Micro Channel Heat Exchanger



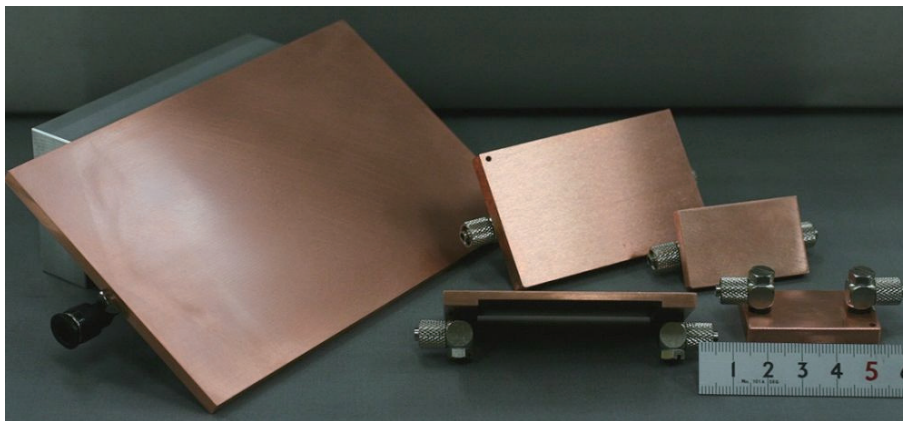
High pressure resistance, very compact, business card size, high efficient heat exchanger

Heat exchange efficiently could be improved by the microchannel, which could realize miniaturization of products. WELCON manufactures heat exchangers of various sizes and materials. We also offer custom orders for factories, refrigerators, air conditioners, fuel cells, automobiles, etc.

Features

- Diffusion bonding: No brazing material is used, and the base material is not melted and is bonded as a solid.
- Achieves corrosion resistance, pressure resistance, and repeatability
- Smaller and lighter than existing products without degrading heat exchange performance
- Contributes to reducing the amount of refrigerant used in the entire system
- High efficiency contributes to shortening heat exchange time

Liquid Cool Micro Channel Heatsink



Effectively for removing heat from the high heat density bodies

In the commonly used "single flow path", there is "heat variation" on the cooling surface. WELCON's fluid distribution design technology is effective in heat-absorbing heat from high heat density bodies by uniform cooling.

Features

- Achievement low flow rate and low thermal resistance compared to heat sinks that do not have microchannels
- By improving the heat-absorbing density compared to conventional products, it is possible to reduce the size, weight, simplification, and energy saving of the pump and pipe arrangement.



For more information
Visit our homepage



Core

Thermal One-stop

Respond to Thermal Control issues with one-stop

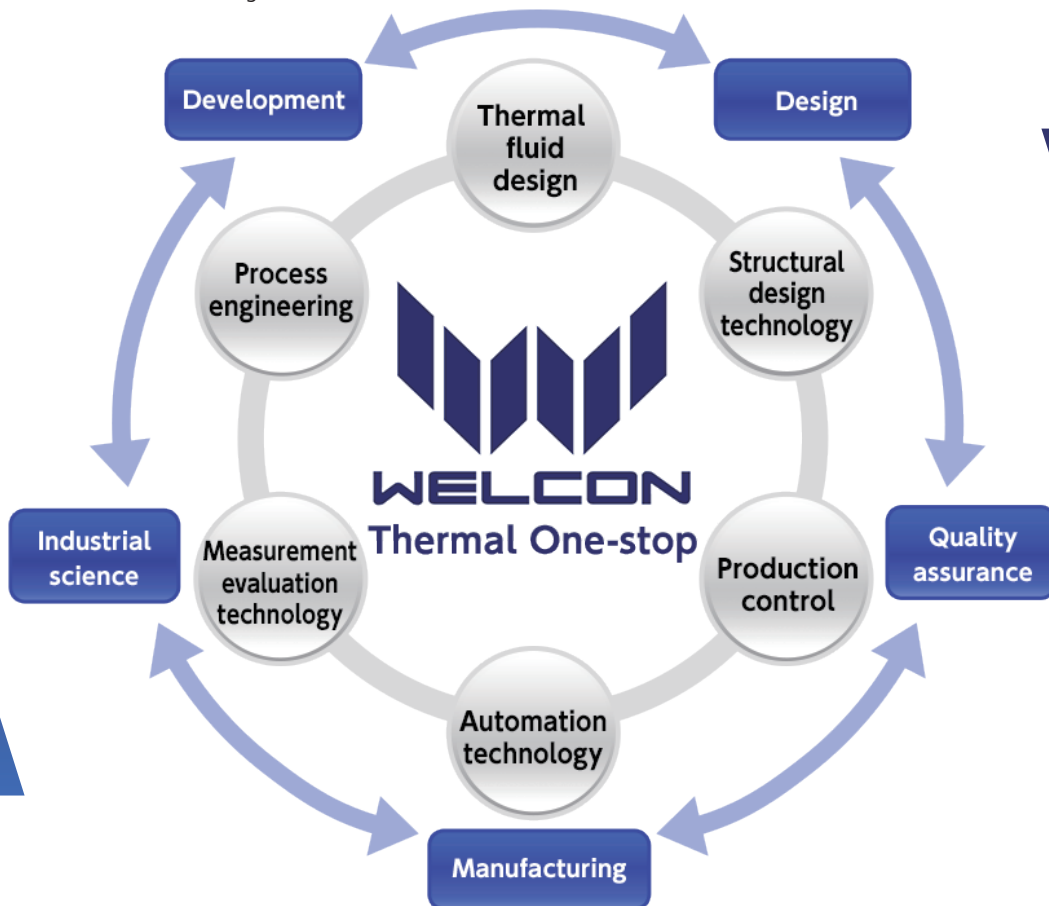
WELCON provides optimal solutions to our customers' technical issues.

One-stop support is available: product planning, R & D, From prototypes to mass production.

We have a wealth of experience in achieving mass production.

We are also actively working on the application of the latest academic technology. We support research and development from the prototype phase.

"Thermal One-stop" is one of WELCON's strengths.



Efforts for mass production

WELCON sincerely would like to tackle with customer's challenges by providing novel features with "micro-three-dimensional structures" and by stable producing such products with good quality.

At our factory, the data obtained in daily production feeds back to help improve production technology.

WELCON will provide customers with market-competitive products by continuous improving production technology through investing the state-of-the-art equipments, factory facilities and Infomation technologies.



About solid state diffusion bonding

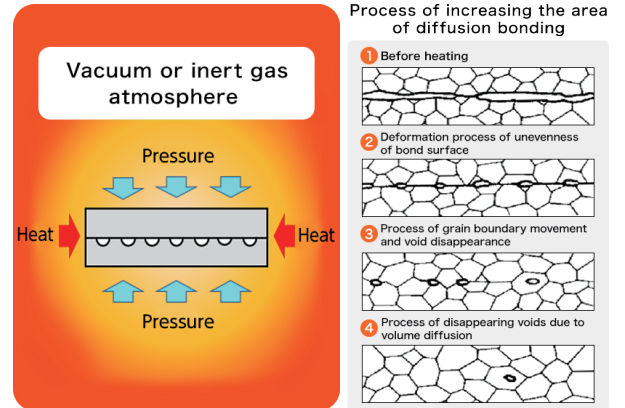
Diffusion bonding is a method of directly joining base materials to be joined, and is different from welding or brazing.

It is a method of bonding by heating and pressurizing the base material to promote the movement of atoms at the bonding interface.

By joining materials in a solid state without melting them, it is possible to create complex hollow 3D structures.

- ▶ **Laminated joining of thin plates is possible**
- ▶ **Bonding force comparable to that of the base material can be obtained**
- ▶ **Complex hollow parts can be manufactured**
- ▶ **Precise bonding with small deformation is possible**
- ▶ **Different materials can be bonded**

The process of solid-phase diffusion bonding has made it possible to fabricate fluidic devices with microchannel structures and devices with complex micro three-dimensional structures.



Our raison d'être and involvement with diffusion bonding

Industrial Applications of Diffusion Bonding

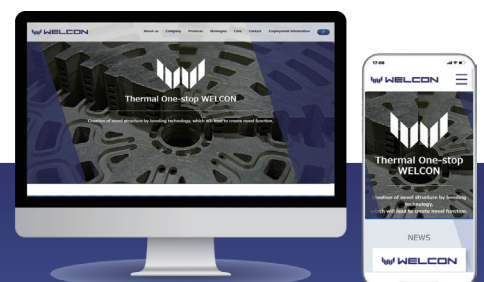
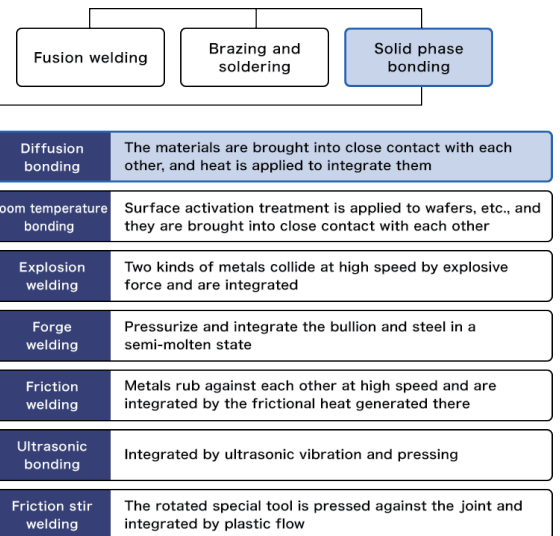
Diffusion bonding, a process technology developed in the late 1950s, was limited to applications in the nuclear, aerospace, and military fields.

WELCON has been working to make diffusion bonding technology suitable for mass production since before the company was founded in 2006. Emphasizing the principles, we have tried to confirm the process on actual machines as much as possible, rather than just using literature or calculation results. One of our strengths, "thermal one-stop," would not be possible without the accumulation of "examination and verification" from material analysis of joined products to mass production, inspection, and quality assurance. By continuing to accumulate this experience, we hope to further strengthen our strengths and meet the various challenges of a wide range of customers.

The following are some examples of fields in which our products and systems have been applied.

- ▶ **Aerospace**
- ▶ **Chemical plants**
- ▶ **Printing machines**
- ▶ **Fuel cells**
- ▶ **Electronic devices**
- ▶ **Semiconductor Manufacturing Equipment**
- ▶ **Information and Communication / Antenna**
- ▶ **Automotive**
- ▶ **Molds**
- ▶ **Medical and inspection equipment**
- ▶ **Hydrogen stations**
- ▶ **Data servers**
- ▶ **Laser and LED cooling**
- ▶ **Food related equipment**

We also have experience in other fields.



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