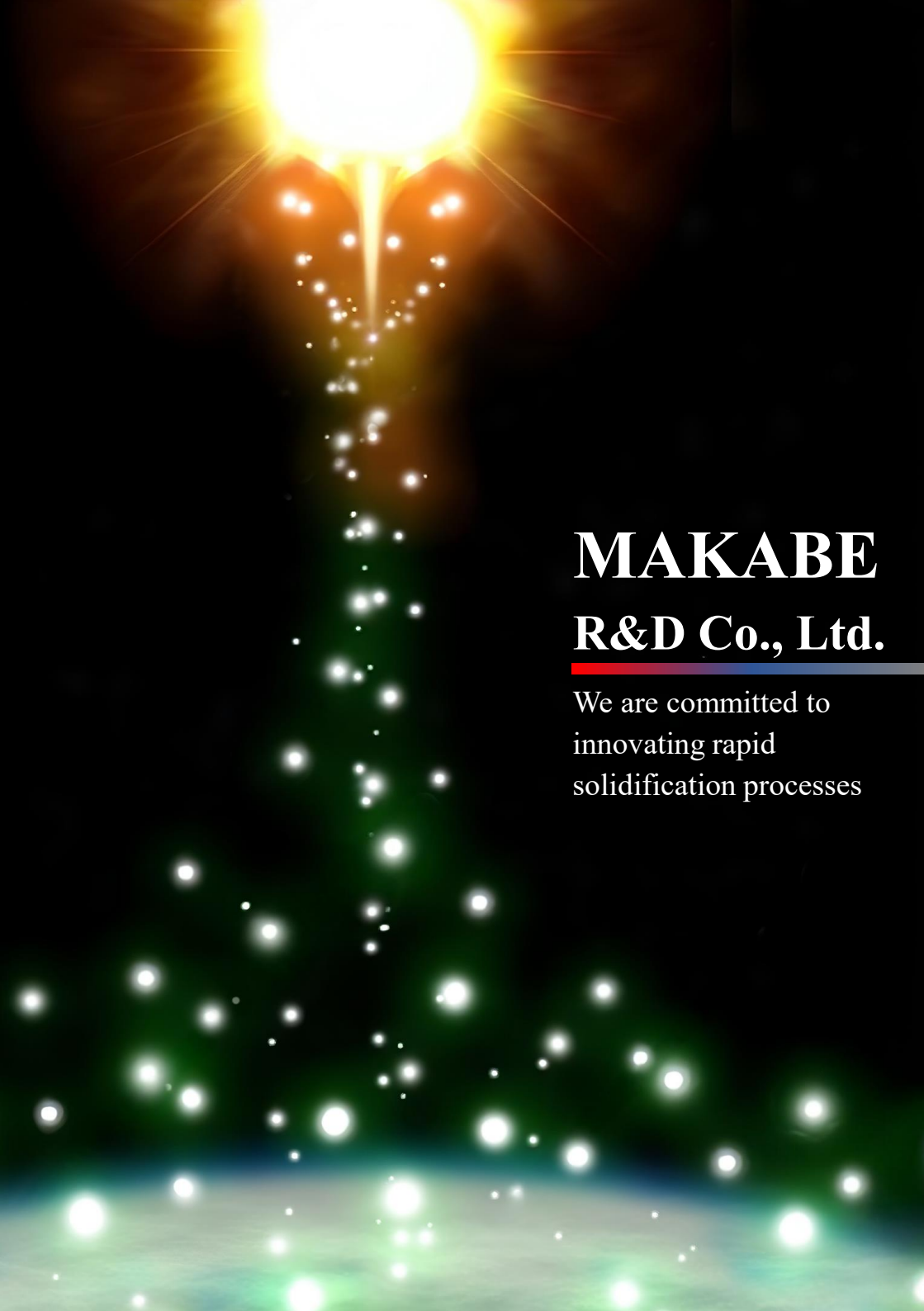


MAKABE
R&D Co., Ltd.

We are committed to
innovating rapid
solidification processes

— MVV —

At MAKABE R&D, we continue to take on the challenge of transforming manufacturing through our core technology: rapid solidification.
Our mission and purpose are to contribute to a sustainable and prosperous society through this unique technology.
Guided by our mission, vision, and values, we are committed to solving our customers' challenges and creating new value through reliable technological excellence.

Mission
– Our Mission and Purpose –

Toward a Prosperous Society Through Rapid Solidification

Vision
– Our Vision and Mid- to Long-Term Goals –

A Leading Company Providing Rapid Solidification Processes Worldwide

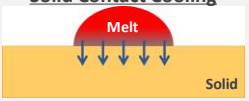
Values
– Our Values and Principles –

We are dedicated to development and continuously refining our core technology — rapid solidification.

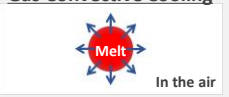
— Rapid Solidification —

Guided by our mission, vision, and values, we are committed to creating value through our core technology — rapid solidification. We continuously refine our three rapid solidification techniques: solid-contact cooling, gas cooling, and liquid cooling. Through these, we provide testing services, equipment, and materials to help solve our customers' challenges.

Solid Contact Cooling

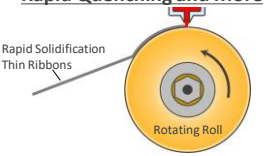


Gas Convective Cooling



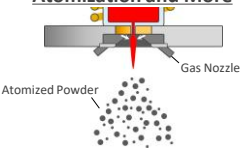
Liquid Convective Cooling

Rapid Solidification Processes: Rapid Quenching and More



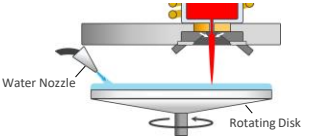
Product Form: Thin Ribbons, Thickness: 20–40 µm

Rapid Solidification Processes: Gas Atomization and More



Product Form: Powder, D50: 20–100 µm

Rapid Solidification Processes: Multistage Atomization and More



Product Form: Powder, D50: 10–20 µm

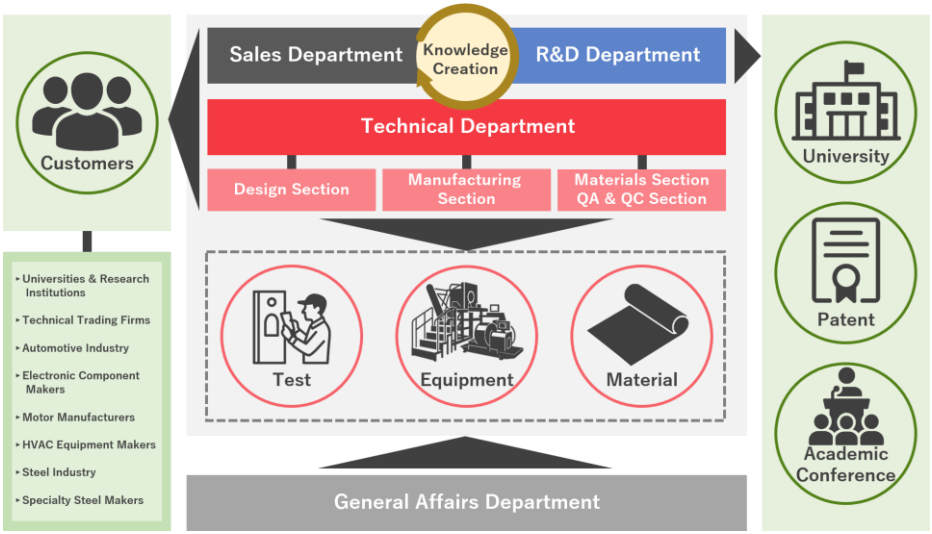
Features

- Amorphization and Nanocrystallization
  - ➡ Low losses (high permeability, low magnetic retention)
- Thinning or micronization
  - ➡ High Frequency Characteristics (Eddy Current Loss Suppression)

Use

- Magnetic components for high-efficiency and high-frequency drives
  - ➡ Motor cores and transformer cores
- Power Electronics Passive Components
  - ➡ Reactor cores and inductor cores

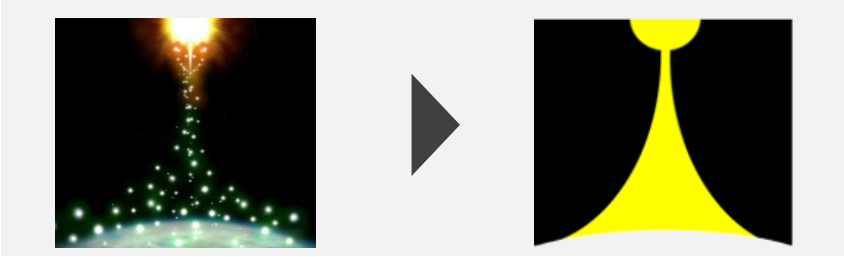
– Organization Chart –



MAKABE R&D operates with a structure centered on three core divisions: Development, Sales, and Engineering. We provide an integrated offering — from contract testing to mass production of equipment and materials — leveraging our expertise in rapid solidification technology.
Through close internal collaboration and external partnerships, we continuously pursue technological innovation and value creation.

– Logo and Corporate Colors –

Logo



The three elements — the Sun, the Universe, and the Earth — are symbolic.
Just as the Earth benefits from the richness and blessings delivered by the Sun, the source of all energy, we see it as our mission to create rapid solidification materials on Earth.
These materials, formed by rapidly solidifying molten metal — like the Sun — possess unique and superior properties that contribute to a better and more advanced world.

Corporate Colors

Red represents molten metal.

Blue represents rapid cooling.

Gray represents solidified metal.

The color scheme, based on three key colors, symbolizes our commitment to advancing rapid solidification technology and providing rapid solidification processes.

– Gas Atomization –

Test

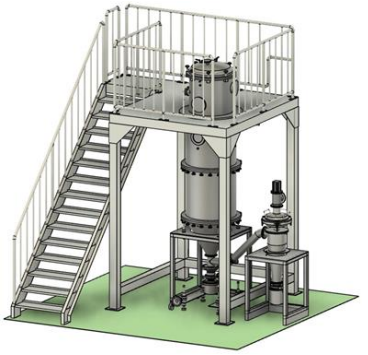
With over 1,200 cumulative tests conducted and gas atomization technology capable of handling various elements, we support powder development.

Please consult us for heating up to 2000℃.

Melting capacity	0.5～20kg
Atomizing temperature	500～2000℃
Atomizing gas type	Ar or N_2
Average Particle Size	20～150μm

Equipment

With over 40 units delivered, our gas atomization systems support precise particle size control — from fine to coarse powders — through a variety of nozzle configurations.



Product Line	Melting capacity
Small-scale Unit	50～200g
Medium-scale Unit	1～20kg
Large-scale Unit	approximately 60 kg

Material

We supply a wide variety of metal powders — including magnetic materials — in ton-scale quantities. Large-scale production is also available upon request.

Please contact us.

– Rapid Quenching –

Test

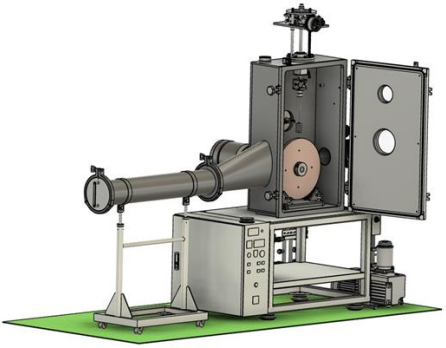
In October 2025, we will introduce a 100 kg large-scale unit.
This system meets a wide range of liquid quenching testing needs, from small batches to mass production scale.

Please consult us for heating up to 2000℃.

Melting capacity	10g～100kg
Heating Temperature	300～2000℃
Ribbon thickness	20～40μm
Ribbon width	1～50mm

Equipment

We are the first domestic manufacturer of Rapid quenching apparatus, with over 100 units delivered.
We support everything from research and development to mass production.



Product Line	Melting capacity
Small-scale Unit	10～200g
Medium-scale Unit	1～20kg
Large-scale Unit	100～200kg

Material

We supply soft magnetic thin strips in ton-scale quantities and support mass production with processing options such as stamping to meet various applications.

Material	Width × Thickness	Batch Production Quantity
Fe-Si6.5wt%	80mm×25μm	50kg
Fe-based Amorphous	200mm×27μm	10t
Fe-based Nanocrystalline	60mm×16μm	200kg

From packages to power devices and installed power sources
— Rapid solidification technology to support power semi-conductors —

1. Product Overview

This catalog introduces "gas atomized metal powders" and “rapid quenched thin ribbons (amorphous nanocrystalline materials)" as rapid solidification materials that play an important role in the fields of semiconductor manufacturing, packaging, and power electronics. Although these materials are not directly used as components of semiconductor devices, they are used in a wide variety of applications, such as heat dissipation materials inside packages, high-efficiency magnetic components, noise suppression elements, and power supply components incorporated into manufacturing equipment.

2. Gas atomized metal powder

— Product Features —

(1) High spherical properties and high purity

(2) Fine particle size with excellent sinterability

(3) Flexibility in alloy design

— Semiconductor-related applications —

- Sputtering target material (Al, Cu, Ti, etc.): for thin film formation
- High-density heat dissipation components (W-Cu alloys, etc.):Contributes to thermal management of power devices
- Leadframe: Adhesion to IC chips with conductive adhesives, surface treatment (plating, sputtering) to improve functionality
- Chip inductor cores for power semiconductors

4. Product Information

— Testing Services —

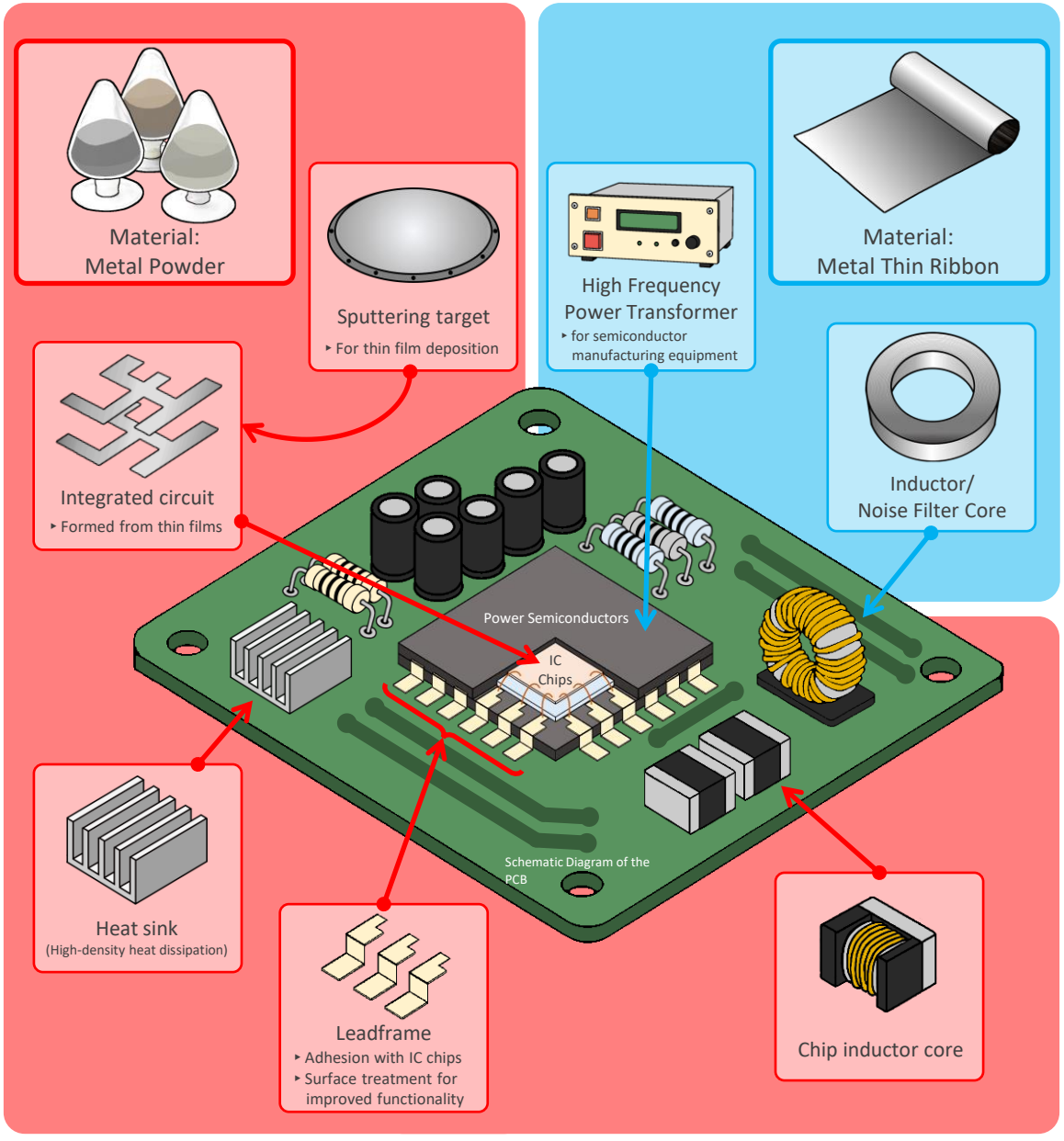
- Start of 100kg thin ribbon test in anticipation of mass production.
- We have a lot of experience in testing various rapid solidification materials.

— Contract Testing Services —

- Support from development to mass production of rapid solidification materials.
- Thin band: 10g - 200kg/charge
- Powder: 50g - 60kg/charge

— Material Provision —

- 200mm wide Fe-based amorphous ribbon



3. Rapid quenching thin ribbon

— Product Features —

(1) Low loss characteristics in the high-frequency range

(2) High saturation magnetic flux density, excellent magnetic permeability

(3) Excellent temperature stability and noise suppression performance

— Semiconductor-related applications —

- High Frequency Power Transformer for Manufacturing Equipment: Used for RF energy control
- Inductors for power semiconductors Transformer core (SiC/GaN compatible)
- Noise filter core (EMC countermeasures): Contributing to the electromagnetic compatibility of equipment

5. Inquiries

For inquiries regarding detailed product specifications, prototypes, and mass production supply, please feel free to contact us at the following address.

MAKABE R&D Co.,Ltd.

Email: m.makabe@makabe-g.co.jp

Tel: 022-235-1614

Scan to Contact Us

MAKABE R&D Co., Ltd.

Company History

1922	Founded by Heikichi Makabe as a bicycle shop and small factory in Aramachi, Sendai.
1952	Heiichiro Makabe established Makabe Iron Works, Ltd. in Tsuchitoi, Sendai, after retiring from the Institute for Materials Research at Tohoku University, and began business with the institute.
1961	Sakue Makabe appointed President.
1975	Developed a Single roll rapid quenching apparatus (amorphous metal production equipment).
1985	Established MAKABE R&D Co.,Ltd. and relocated headquarters and factory to Nigatake, Miyagino-ku, Sendai.
1986	MAKABE R&D Co.,Ltd. merged with Makabe Iron Works, Ltd.
1991	Eiichi Makabe appointed President.
1993	First delivery of a 60-kg gas atomization system.
1996	First delivery of a 150-kg gas atomization system.
2014	Started contract testing as a new business.
2019	Masahiro Makabe appointed President.
2022	Obtained ISO 9001:2015 certification. 100th anniversary of establishment.
2025	Obtained SDGs certification.

Supporting the Future of Semiconductors with Technology and Trust

Makabe Giken accelerates industrial innovation through cutting-edge materials.

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