Supporting a Global Future with Advanced Composites

Advanced Composite Corporation

Corporate Guide

Advanced Composite

Philosophy / Mission of Advanced Composite

Through the development of new composite materials, we give them optimal properties that could not be achieved with single materials and promote dramatic weight reduction and energy conservation to revolutionize the world's industries. As a result, we will contribute to solving global environmental problems and aim to realize a sustainable society.

Advanced Composite

Company Profile

Company name ： Advanced Composite Corporation

Address ： 2259-9 Oobuchi, Fuji City, Shizuoka, Japan

Tel ： +81(0)545-32-7904

Date of Establishment ： 22th of July, 2015

Capital amount ： 330 million yen

Representative ： Takatoshi Shoji

Branch ： Tokyo Branch
2-23-1-315 Yoyogi, Shibuya-ku, Tokyo
Tel +81(0)3-5050-2800

Main Businesses

Development, manufacture and sales of Metal Matrix Composite materials and Joined products using Squeeze Casting Technology

What we are working on

Making the Material Stronger

Aluminum＋Ceramic／Carbon／Metal

We solve the problems related to weight reduction, high strength, thermal expansion and heat dissipation by a customized design and development of “Metal Matrix Composites" with aluminum as the core..

Our core technologies to support product development

High Pressure Press Machines (9 machines owned) for Squeeze Casting

Using **Squeeze Casting Technology**

* We will improve the problems such as internal defects, insufficient strength, material restrictions and so on that remained with conventional forging and casting technology.

* There are four application technologies: High Performance Metal, Joining, Insert Casting, and Metal Matrix Composites (MMCs).

* Previously unobtainable with single materials by other methods, we design and manufacture new materials with unprecedented functions, physical properties and characteristics."

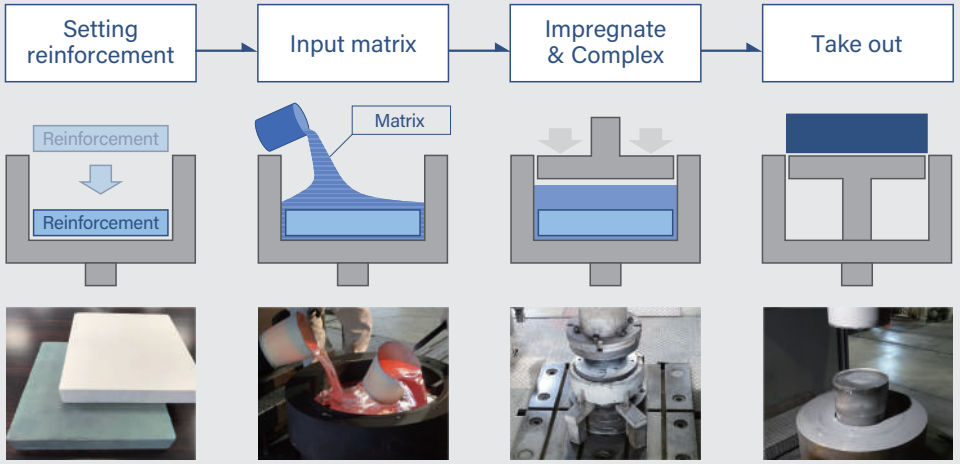
Composite Technology	Joining Technology
Designing and manufacturing new MMCs with properties that have never existed before.	**Joining dissimilar materials that was not possible before.**

Our Strength

We can achieve dramatic improvements in properties by designing composite materials with characteristics and functions that cannot be achieved with a single material.

World-class

Squeeze Casting Technology



Our 4 applied technologies using Squeeze Casting: High Performance Metal, Joining, Insert Casting, and MMCs.

Squeeze Casting is a method of casting an alloy with excellent characteristics by putting molten metal into a mold and solidifying (molding) it by applying high pressure.

It is suitable for the fabrication of MMCs by impregnating the reinforcement preform with a Matrix, joining solid dissimilar metals, and producing a cast-in heater as well.

This casting method produces castings with a dense alloy structure, fewer blowholes, and improved strength and fatigue properties.

Our 4 applied Technologies using **Squeeze Casting***

*Our core technology is a high-pressure casting method / a liquid forging method called "Squeeze Casting".

Metal Matrix Composites (MMCs)

Technology to combine "reinforcing material" and "matrix material" by the squeeze casting method.

Compressor scrolls
AC-Albolon

ACM-io
Positioning Jigs

ACM-a
LED chip

High Performance Metal

Technology for casting aluminum with overwhelmingly few blowholes by applying high pressure using the squeeze casting method.

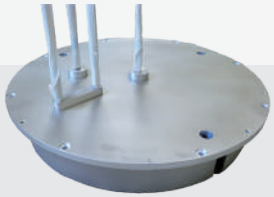
Air Compressor
Scrolls

Piston for
Diesel Locomotive

Piston Sleeve

Insert Casting

With this technology, heater wires, water cooling pipes, etc. can be successfully cast in molten aluminum without air layer to integrate.



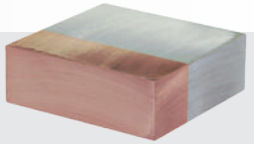
Heaters in semiconductor manufacturing equippment

Joining

Technology that strongly joins dissimilar materials or the same material by squeeze casting method, even for materials with large differences in thermal expansion.

IH Cooking plates

Cooler parts



Copper & Aluminum joining

Our Strength

Material Property Design Technology

to Customize and Optimize for its Purpose

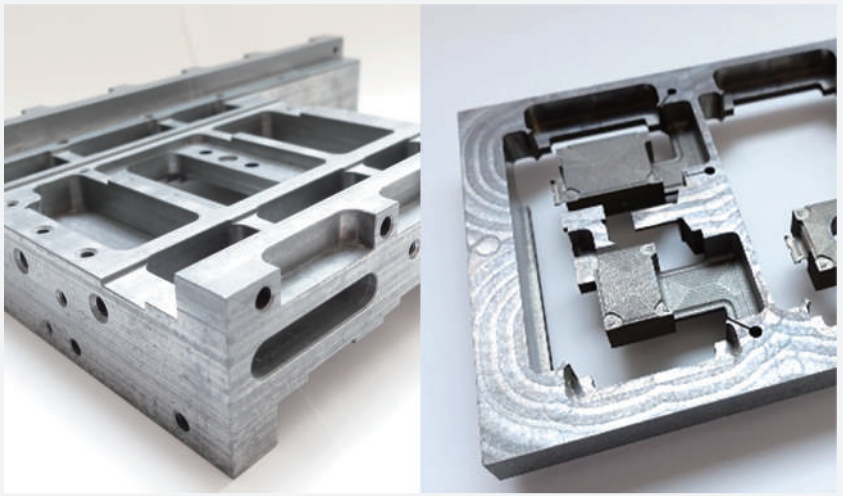
Designing MMCs with various properties, which could not be achieved with a single metal, to meet the challenges of the growing industry

In order to make full use of the merits of composite materials, not only as a substitute for metals, we select the properties of the materials, change the ratio, and adjust the thermal expansion, thermal conductivity, rigidity, etc. according to the user's required properties.

In this way we have established a method for designing and proposing new materials.

Experiences in Manufacturing Metal Matrix Composites(MMC)

with Aluminum as a Core Matrix



Production and distribution of semiconductor manufacturing equipment parts made from MMC

We are one of the few companies that actually develops, manufactures, and sells various aluminum-based composites ahead of other companies.

We develop AC-Albolon, which has excellent Machinability, and ACM, which is a graphite composite material, ahead of other companies.

AC-Albolon	AC-Alsic	AC-Alox
AC-Alcon	ACM-a	ACM-io

MMC created by Advanced Composite

(Metal Matrix Composites)

AC-Albolon aluminum => aluminum borate

Characteristic

- Rigidity as cast iron, density as aluminum, coefficient of thermal expansion as SUS
- Eexcellent processability, enabling cutting with carbide tools
- Excellent vibration damping

As a replacement material of iron/ aluminum achieving higher speed and accuracy

ACM-io aluminum + graphite (Isotropic)

Characteristic

- The density is as small as graphite, and the coefficient of thermal expansion is as low as ceramics.
- Higher strength than graphite, enabling finer machining
- Compared with graphite, it generates less dust and is easier to plate

Improved strength and thermal expansion as a replacement material of graphite

AC-Alsic aluminum + silicon carbide

Characteristic

- Rigidity comparable to cast iron and SUS, density comparable to aluminum
- Possible to change the ratio of aluminum and SiC according to the application
- Excellent vibration damping

Higher speed and higher precision as an replacement material for ferrous materials

ACM-a aluminum + graphite (anisotropic)

Characteristic

- Thermal diffusion is about twice of copper, the specific gravity is about 25% of copper, and the thermal expansion is about 40% of copper
- Thermal diffusion is 2.7 times that of aluminum, density is 77% that of aluminum, heat expansion is 35% of aluminum
- Resistant to heat cycles

Improved heat dissipation and thermal expansion as a replacement material for copper and aluminum

Owned equipment

Revised: August 2022

Process	Function	Target	Name of equipment	Qty	Bldg.No
Manufacturing	Press	Material	3,000 Ton press machine	1	2
			1,500 Ton press machine	6	2・4
			1,000 Ton press machine	2	2・3
			300 Ton press machine	1	2
			Powder forming press machine	1	2
			Melting furnace	9	2・4
			Muffle furnace	8	2
			Heat treatment furnace	1	2
			Firing furnace	1	2
			Pulse current sintering	2	2
			Ball mill	2	2
			Vibration machine	4	2
	Processing	Product	Machining center	4	1・4
			General-purpose lathe	1	1
			Large lathe	1	1
			Precision general-purpose lathe	1	1
			Milling machine	4	1
			Band saw	4	1
			Tapping machine	1	4
			Grinder	2	2
			Contour machine	1	1
			Drill press	1	2
			Fine cutter	2	2
			Cut-off machine	4	1
			Wire electric discharge machine	1	4

Process	Function	Target	Name of equipment	Qty	Bldg.No
R&D and quality assurance	Analysis	Material	Stationary emission spectrometer	1	4
		Material Product	Scanning electron microscope	1	4
		Material	Universal testing machine	1	4
		Material Product	Digital microscope	1	4
		Material Product	Stereo microscope	1	4
		Material	Ultrasound imaging device	1	2
		Material	Thermomechanical analyzer	1	2
		Material	Fatigue tester 50kN	1	2
		Material	Precision cutting machine	1	1
		Material	Forming grinder (mm) X500 x Y150	1	1
	Measurement	Material	Ultrasonic flaw detector	1	4
		Product	Contour shape measuring machine	1	4
		Material Product	Small surface roughness measuring instrument	2	4
		Material Product	Image measuring instrument (Mitsutoyo)	1	4
		Material Product	Image measuring machine (KEYENCE)	1	4
Other	Design		2D/3D-CAD	3	Office
			CAD/CAM	2	4

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https://advance-composite.co.jp/

Access

By train

About 30 min. by Taxi from Fuji Station on the Tokaido line or Shin-Fuji Station on the Shinkansen.

By car

About 20 minutes from Tomei Expressway Fuji IC, or about 15 minutes from Shin-Tomei Expressway Shin-Fuji IC".