

Aluminum Casting A Constantly Evolving Technology

We re creating the future with advanced sand-mold aluminum casting technology.

Tajima Light Metal Co., Ltd. has consistently produced aluminum castings using the sand-mold casting process since its establishment. During this period, we have challenged various new manufacturing technologies with the aim of being a technology development-oriented company. Our three core technologies, all of which were developed in-house, are Large-scale aluminum castings, Metal Matrix Composite (MMC) castings, which are aluminum composite new materials, and Pore-Less Cast (PLC) high quality sand-mold aluminum castings. These advanced Tajima manufacturing technologies are a driving force in the evolution of casting. With our gaze fixed firmly on the future, we will continue to create and support the future of Japanese industry with passion and proven technologies.



Masaaki Tajima
President and Representative Director

- Corporate Philosophy**
1. We will convey sincerity and enthusiasm through greetings.
 2. We will strive to achieve innovation in our industry by improving our skills and technology.
 3. We will endeavor to protect the environment through concerted efforts with regional society.
 4. We will convey a grateful heart by love of family and belief in our colleagues.
 5. Our company's greatest joy is the "growth" and "affluence" of its employees based on the idea that "manufacturing builds people."

Company Profile

Company Name	Tajima Light Metal Co., Ltd.
Location	Head office/Foundry 1375, Fujiikamigumi, Hanyu City, Saitama Prefecture, 348-0064 Japan Tel: +81-48-563-5221 Fax: +81-48-563-4335 Komatsudai Factory 2-705-32, Komatsudai Hanyu City, Saitama Prefecture, 348-0038, Japan Tel: +81-48-580-7743 Fax: +81-48-580-7746
Founded	1968
Capital	JPY 20,000,000
Representative Director	Masaaki Tajima
Number of Employees	65
URL	http://www.tac-casting.com (e-mail: tjm@tac-casting.com)

Sales Item Aluminum castings, Aluminum composite castings, Molding patterns, Mold rollover machine, Heat treatment, Surface treatment (blasting), Machining

History

- 1968 Founded (Kawaguchi area in Saitama Prefecture)
- 1982 Tajima Light Metal Casting Private Limited Company was established.
- 1990 Company name was changed to Tajima Light Metal Co., Ltd.
- 1994 Relocated to the current location (Hanyu City, Saitama Prefecture)
- 1996 Started MMC business (collaborated with Ceranx Co., Ltd.)
- 1999 Expansion of Large casting shop
- 2004 Expansion of MMC shop, introduction of large heat treatment furnace
- 2007 Awarded Technical Prize from Japan Foundry Society, Inc.
- 2008 Expansion of business at new plant
(Heat treatment, Surface treatment (blasting), Machining)
The company was selected as one of "The most active 300 small and medium size monozukuri companies"
- 2009 The company was designated as a "Factory in Sai-no-Kuni" in Saitama Prefecture.

Main Products and Businesses

Aluminum casting products

Semiconductor/liquid crystal/solar cell manufacturing equipment parts, engine parts (ships, trucks, generators), industrial robot parts, medical equipment parts (X-ray CT devices, dental medicine equipment), railway rolling stock parts (shinkansen super express), vacuum equipment parts, large-scale press jig parts, cast aluminum building materials, castings for landscaping, aerospace parts, parts for other industrial machinery (cast-in heating/cooling plates, large-scale rollers, pulleys, motor parts, electrical wiring hardware, etc.)

Metal Matrix Composite (MMC) casting product (containing SiC ceramics)

Semiconductor/liquid crystal manufacturing equipment parts, parts for various types of inspection equipment, assembly device parts (chip mounters, etc.), machine tool parts (presses, lasers, high speed NC machine tools, etc.), parts for other precision equipment, etc.

Manufacture and sale of motorized mold rollover machines (trade name: "Universal Hanger")

Twin-cylinder type, TUH series (maximum weight: 400kg 2,600kg); spreader beam type, TUHA series (maximum weight: 1,000kg 20,000kg)

Heat treatment

Heat treatment of aluminum castings (treatment capacity: size, approx. 2.5m x 3.5m; types of heat treatment: solution treatment, aging, annealing)

Blasting

Sand blasting (blasting media: alumina, silica sand), shot blasting (blasting medium: SUS, equipment: hanger shot, drum shot, table shot)

Machining

Large-scale machining center machine tool (machining capacity: size, approx. 2.2m x 5m)
Large-scale turning center machine tool (machining capacity: size, approx. 2.2m in diameter)



Head Office / Foundry

(Site area: 4422m², building area: 2439m²)

Main Equipment

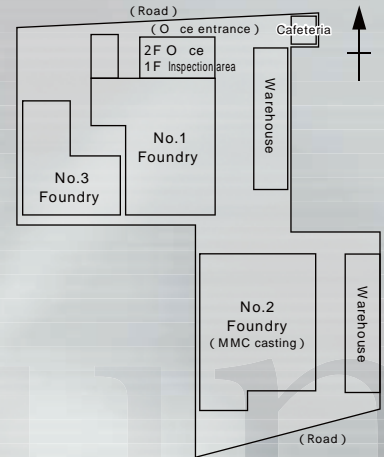
- Furan organic self-hardening sand treatment equipment
- Motorized mold rollover machine
- Vacuum electric melting furnace
- Continuous gas melting furnace
- Tilting gas melting furnace
- Melt purification and degassing equipment
- Movable melting and holding furnace
- Shot blast machine
- Spectrometry equipment
- Elastic modulus measurement device
- Digital microscope
- CAD/CAE system



Large-scale castings production line



Vacuum electric melting furnace

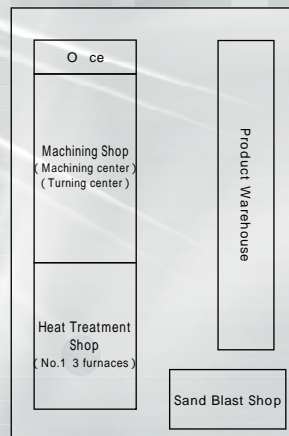


Komatsudai Factory

(Site area: 3833m², building area: 1512m²)

Main Equipment

- Large-scale heat treatment furnace
- Full-automatic small-scale heat treatment furnace
- Sand blast equipment
- Large-scale machining center
- Large-scale turning center
- CAD/CAM system
- Brinell hardness tester
- X-ray inspection equipment
- Helium leak test equipment



Large-scale heat treatment furnace



Machining center

ACCESS MAP



Access to Head Office

Car Tohoku Expressway
Distance of 4km from Hanyu IC

Train Tohu Isesaki Line / Chichibu Line
Distance of 3km from Hanyu Station

INFORMATION

Selected for the 2008 Edition of the Most Active 300 Small and Medium Size Monodzukuri Companies (published by Japan's Small and Medium Enterprise Agency)



Certified as a "Sai-No-Kuni Designated Factories" in 2009 (recognition of excellence in technical capabilities and environmental protection by the government of Saitama Prefecture)

TECHNOLOGY



Large-Scale Aluminum Casting Technology

Tajima Light Metal boasts the industry's top class technology and equipment for large-scale aluminum castings.

With a wealth of experience and know-how and independently-developed technologies, Tajima produces large aluminum castings exceeding 2.5t.



Casting of large-scale aluminum casting using large-scale mold rolover machine developed in-house.



Self-propelled large-scale motorized bogie type casting line



Example of ultra-large-scale casting (diameter exceeding 3m)



Liquid crystal panel manufacturing equipment parts



Jig for inspection of side-panel parts of automobile



Liquid crystal panel manufacturing equipment parts



Jig for machining rocket components

Metal Matrix Composite (MMC) Casting Technology

Manufacture/development commissioned by Nihon Ceratec.

[New Material] SiC Ceramic/Aluminum Composite (MMC) Casting

A new material that makes impossible dreams a reality... The light weight of aluminum and higher rigidity than cast iron!

● **What are SiC/aluminum composite (MMC) castings?**

MMC (Metal Matrix Composites) are high performance functional castings consisting of an SiC/aluminum composite material, in which SiC ceramic particles are uniformly dispersed in an aluminum alloy.

Produced by the gravity sand-mold casting process or by a new technology, the "Hybrid Low Pressure Sand-Mold Casting Process." With gravity sand mold casting, the SiC content (volume) is 15-30%. With the new Hybrid Low Pressure Sand-Mold Casting Process, SiC contents higher than 40% are possible.

● **Main features**

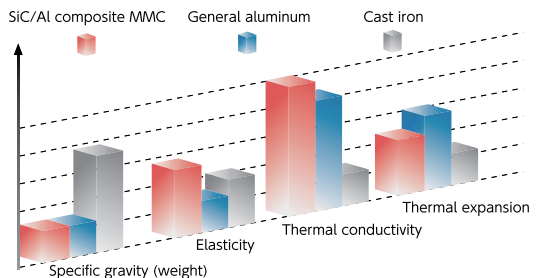
• Specific gravity (weight) and thermal conductivity are the same as those of aluminum, while thermal expansion is only 2/3 that of aluminum. MMC also has rigidity is more than 2 times that of aluminum, and thus possesses extremely high properties exceeding those of cast iron.

• Because a casting process is used as the manufacturing method, it is possible to manufacture large-scale products (500kg or more) with complex shapes.

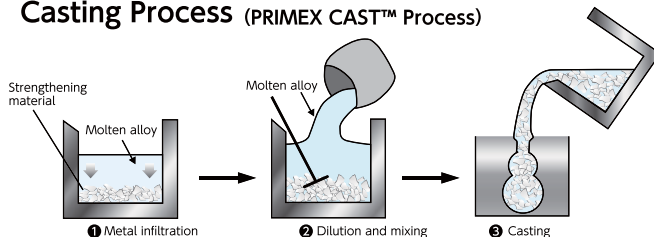
● **Main applications**

Used in parts in precision machinery such as chip mounters and high-speed presses, inspection equipment, and various types of parts in the liquid crystal and semiconductor manufacturing equipment fields, where light weight and high rigidity (low flexure and deformation) are necessary, or where high speed movement and stopping (low inertia) are necessary.

Typical comparison of main properties with other materials



Casting Process (PRIMEX CAST™ Process)



MMC Casting SiC volume ratio	Density (g/cm ³)	Elastic modulus (GPa)	Coefficient of thermal expansion (×10 ⁻⁶ /K)	Thermal conductivity (W/m·K)
SiC25%	2.75	116	15.3	—
SiC30%	2.78	125	14.4	150
SiC40%	2.83	155	12.6	154

(Values are for reference only.)



Expanding the Applications of Aluminum Castings with Evolved Casting Technology “ Pore-Less Cast (PLC) ”

Realized by PLC (High Quality Sand-Mold Aluminum Casting)

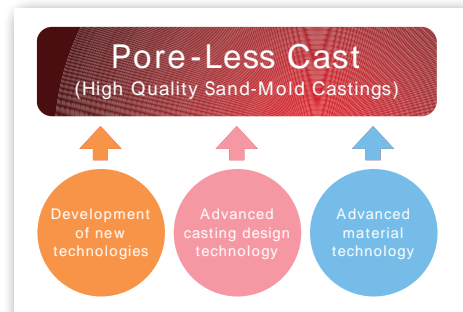
- Change over from conventional rolled or machined aluminum products (vacuum/airtight parts, high reliability parts, etc.) to “Pore-Less Cast (PLC)”
- Change over from conventional welded structural parts consist of stainless steel or aluminum plate to “Pore-Less Cast(PLC)”

● What is Pore-Less Cast?

Tajima Light Metal established a technology which absolutely minimizes shrinkage porosity defects in sand-mold aluminum castings by development of a new induction heating technology of riser and development and improvement of various other technologies, such as casting design, material technology, etc. The high quality sand-mold castings produced using this technology are called Pore-Less Cast products.

● Features and Applications

By greatly improving internal quality in comparison with conventional castings, Pore-Less Cast has expanded the range of new applications for castings to high airtight parts and high reliability parts, which had been difficult to produce by casting processes until now. Pore-Less Cast products are used in vacuum parts of vacuum chambers and vacuum pumps and in critical parts of industrial machinery, enabling a changeover from parts which had been produced by machining of rolled materials, welded structures, etc.



Development of New Technology: High Frequency Hot top Heating System Casting Process

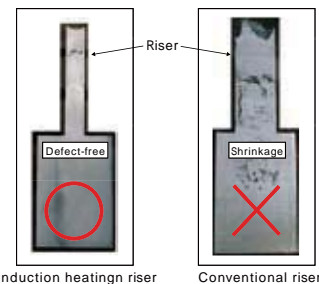
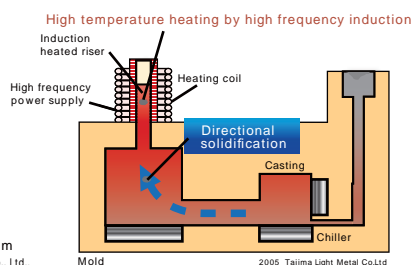
Heating of riser by high frequency induction

Dramatic improvement in riser effects

- <Effects > Prevention of shrinkage porosity defects (quality improvement)
Improved yield and reduction of man-hours required in finishing (cost reduction)

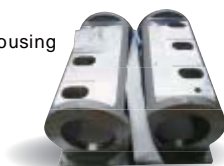


Casting process using Induction heating riser system
Developed jointly by Tajima Light Metals Co., Ltd., Daihatsu Metal Co., Ltd., and Dai-ichi High Frequency Co., Ltd.



Examples of Pore-Less Cast Products

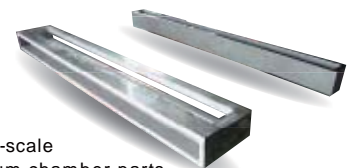
Vacuum pump housing



Vacuum valve case



Large-scale vacuum chamber parts



Vacuum chamber

Large-scale vacuum chamber



(Helium leak test)

MAIN PRODUCTS



Semiconductor/Liquid Crystal/Solar Cell Manufacturing Equipment Parts

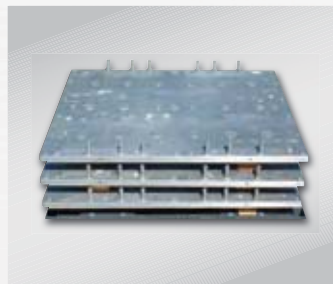
Tajima Light Metal Co. produces a wide variety of cast parts for manufacturing equipment for semiconductors, liquid crystal panels, solar cells, and other components used in cell phones, personal computers, televisions, and solar power systems.



Large-scale base



Housing



Pipe cast-in cooling plate



Engine Parts

We produce various parts used in engine and transmission-related parts for applications ranging from large-scale ships to automobiles, generators, etc.



Transmission case (marine)



Oil pan (marine)



Engine part (marine)



Housing (automobile)

Medical Equipment Parts

Our casting parts are also used in the medical equipment field supporting health, for example, in X-ray CT devices, equipment for dental medicine, etc.



Medical X-ray CT device part



Medical equipment part

Aerospace and Research Related Products

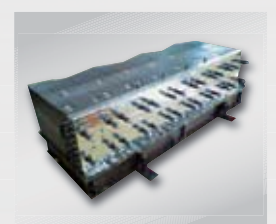
We support advanced industries with "Japan's first" and "world's first" leading-edge casting technologies, producing jigs used in machining rocket parts, components for artificial satellite test devices, components for atomic physics research equipment, etc.



Large-scale jig for part machining (rocket)



Test device component (satellite)



Component for nuclear physics research equipment (J-PARC: Japan Proton Accelerator Research Complex, Tokai-mura)



Industrial Machinery and Castings for Landscaping

Tajima's casting technology plays a key role in all fields, from industrial robots, machine tools, and other general industrial machinery to castings for landscaping and outdoor art objects.



Robot arm



Pulleys



Impeller



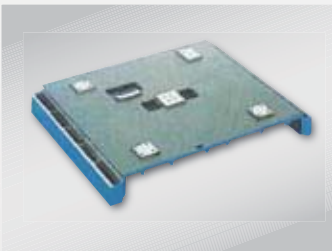
Cast nameplate



Outdoor art
(in front of Nagoya Station)

SiC/Metal Matrix Composite (MMC) Casting Products

SiC/MMC materials, in which SiC ceramics are dispersed in an aluminum metal matrix, are high-performance new materials which provide the light weight of aluminum combined with rigidity equal or superior to cast iron. Making full use of its advanced casting technologies, Tajima produces various MMC cast products for fields such as semiconductor/liquid crystal panel manufacturing equipment, machine tools, and other precision machinery. (Manufacture/development of parts under commission from Nihon Ceratec)



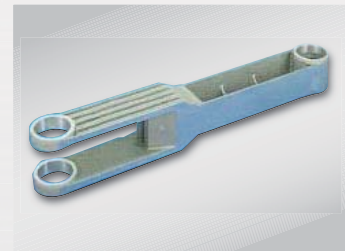
Movable stage



Bracket



Case



Large-scale robot arm

Motorized Mold Rollover Machines: "Universal Hanger"

Tajima manufactures and sells two lines of motorized mold rolover machines under the trade name "Universal Hanger." This equipment was developed jointly with Mitsubishi Heavy Industries.

Use of a machine which can perform all three of the processes of pattern drawing, rolover, and mold fitting has made it possible to double the efficiency of the conventional molding work.

All of the lines at Tajima's plant are equipped with motorized rolover machines ranging from a 1t to a 20t type. This equipment demonstrates its effectiveness in safe, high efficiency casting production.



Twin cylinder type TUH series
(max. weight: 2,600kg)



Spreader beam type TUHA series
(max. weight: 20,000kg)

Motorized mold rolover machines "Universal Hanger"

Twin cylinder type motorized mold rolover machines: TUH series
(Used by installation on existing girders and supports, etc.)

Model	Max. weight	Hoist motor capacity
TUH-05	400kg	1kW
TUH-01	900kg	1.4kW
TUH-20	1,800kg	3kW
TUH-28	2,600kg	3kW

Spreader beam type motorized mold rolover machines: TUHA series
(Used by hanging from existing crane)

Model	Max. weight	Hoist motor capacity
TUHA-10	1,000kg	1.2kW
TUHA-30	3,000kg	2.3kW
TUHA-50	5,000kg	4kW

(10,000kg - 20,000kg; Estimates will be provided upon request.)