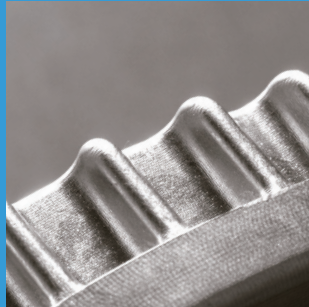
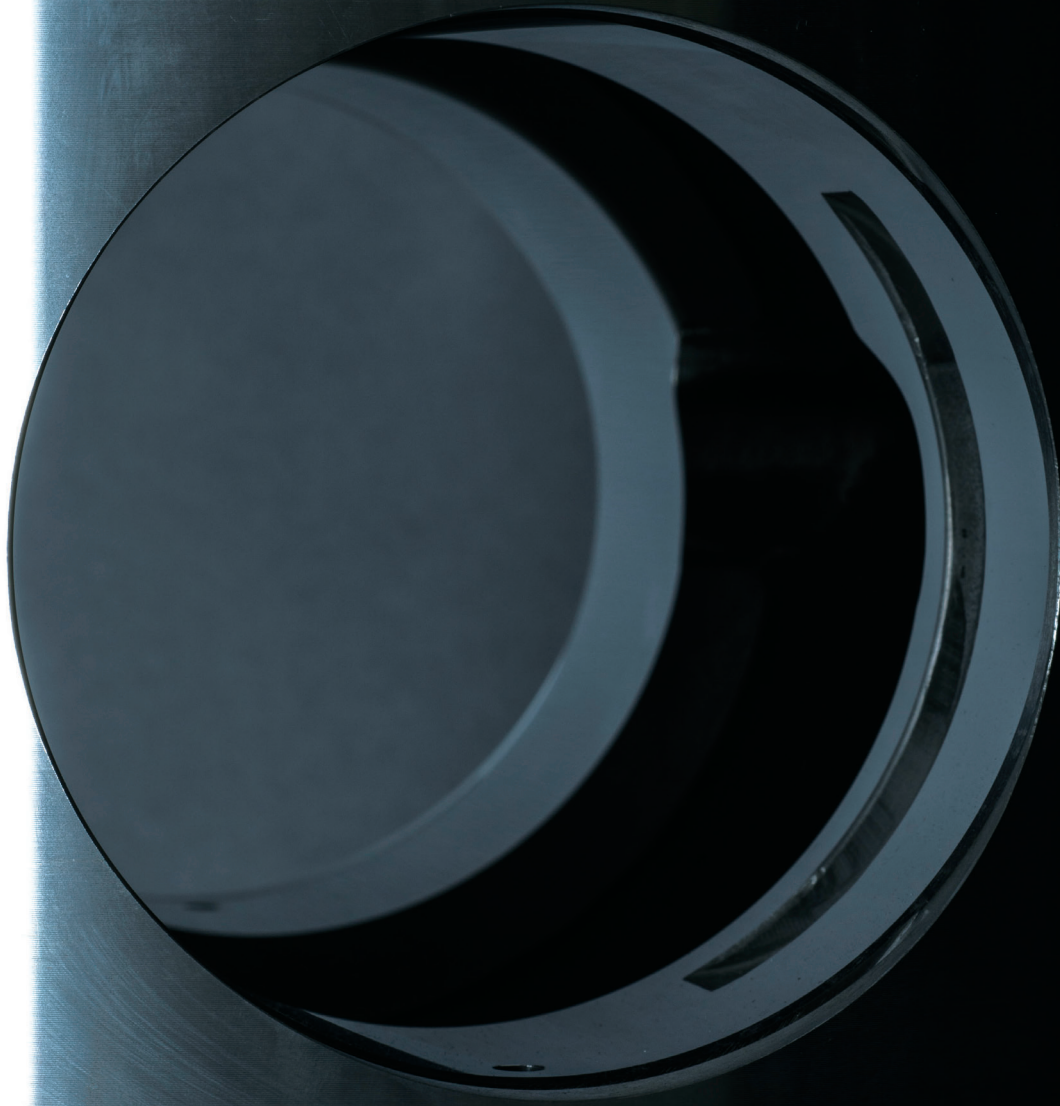


# TOKOROZAWA ALLOY FOUNDRY



Newest Technology:1

T-Casting





# Uniform Super-high Density & Thickness

T-casting is the ideal casting technique for products where high quality is required in the strength and grain size, such as highly efficient engine parts and various frame materials. Products manufactured by the creative techniques of T-casting, have high-density and high-definition features beyond the common knowledge of conventional cast products. By achieving a grain size which is equal to forging, high dimensional stability and durability can be achieved in products used under high temperature, which greatly improves the reliability of products. The high level of the T-casting quality has already been proven through its introduction into a large number of products, making full use of the latest technology. Particularly, the high level of the grain size quality is astonishing in the improvement of quality in products which require heavier wall thicknesses. Naturally, it can handle any type of molding by performing precision machining.

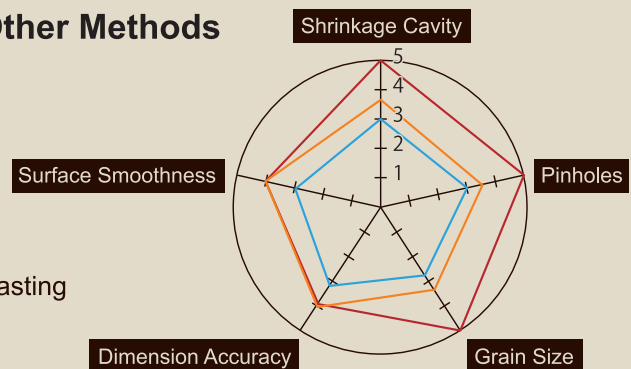
## Conventional Manufacturing Problems

Conventionally, it was difficult to perform quality control of the internal features. So, it was necessary to make designs considering of the low uniformity of the heavier wall thicknesses. Also, the shrinkage cavities and the occurrence of pinholes could not be avoided.

## Quality Performance Comparison with Other Methods (Each one is of high quality)

\* Since T-casting is a mass production casting method with advanced internal quality, the quality performance was compared with other similar casting methods.

— T - Casting    — Sand Casting    — Gravity Casting



## Grain Size

POINT\_1

We can achieve microscopic grain sizes, which was impossible using conventional casting techniques. High quality product features can be achieved without relying on high cost forging methods. This technology balances the quality and cost at a higher dimension.

## Product Stability

POINT\_2

We can achieve a minimization in the shrinkage cavities and occurrence of pinholes, which is a part of cast products. Among the current casting techniques, the most stable internal features can be achieved. As such we do not allow the emulation of other products.

## Heavy Wall Thickness Compatibility

POINT\_3

We can achieve uniform feature quality from the casting surface to the center portion. This heavy wall thickness compatibility upsets the conventional common knowledge, such as the feature density becoming rough towards the center of the heavy wall thickness portions, increases the flexibility of product designs, and allows for the production of products.

Newest Technology:2

Direct Casting





# Accuracy of up to 2/100mm without Machining

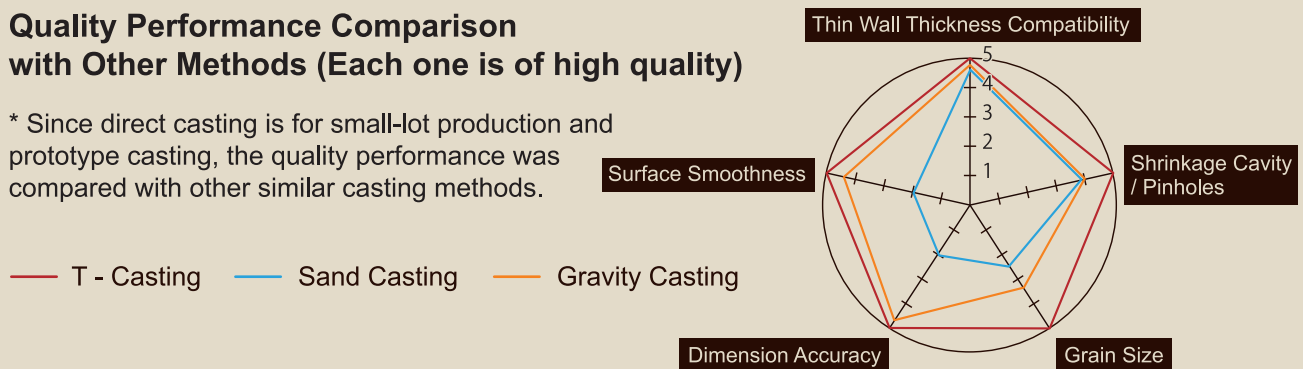
Direct casting is an ideal casting technique for small-lot production or products in the prototype examination stage. Uniquely manufactured direct casting proudly provides amazing completion accuracies of 2/100mm, without performing any machining processes, which are unavoidable with common casting methods. Accordingly, this allows for great reductions in the product delivery period, not only reductions in the cost per product, which could not be avoided in small-lot production. The predominant points of direct casting are not only the high dimensional accuracy, costs and merits of a shorter delivery. The basic quality of casting products, such as compatibility with thinner wall thicknesses, shrinkage cavities, pinholes, grain size and the smoothness of the casting surface which greatly influences the basic quality of cast products, also provides values which greatly exceed common casting techniques.

## Conventional Manufacturing Problems

▶▶ We needed to reduce costs related to machining and cut long delivery times. The lack of compatibility with complicated thinner walls, made it difficult to create complicated moldings without any machining.

## Quality Performance Comparison with Other Methods (Each one is of high quality)

\* Since direct casting is for small-lot production and prototype casting, the quality performance was compared with other similar casting methods.



## Super-High Precision

POINT\_1

Achieved a 2/100mm finished dimension without a machining process. This is ideal for small-lot production where there is a need to reduce the costs of machining processes and prototypes, which require various types of production for a single product.

## Thin Wall Thickness Compatibility

POINT\_2

We can achieve thin wall thickness compatibility, which is equivalent to conventional casting methods where finishing was performed by a machining process. The ability to handle complicated moldings using an effective molten flow is also a great feature of direct casting.

## Grain Size

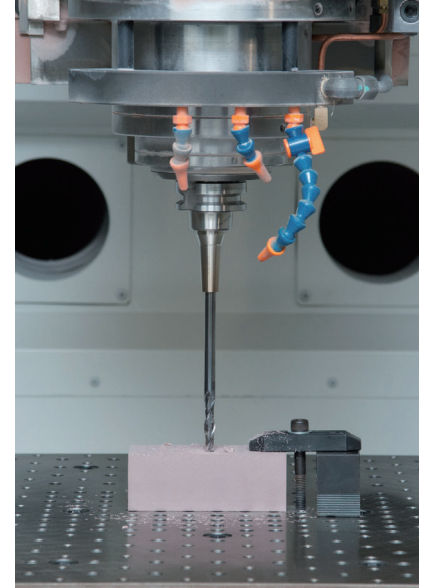
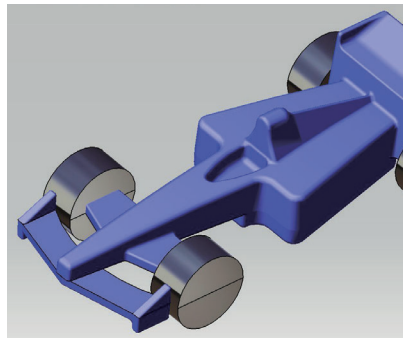
POINT\_3

We can achieve precisely arranged grain sizes. Even in prototypes which require strength tests, etc., as well as the quality control of small-lot production, the grain size of high definition direct casting fully demonstrates its function as a benchmark to accurately determine if a prototype can be moved to mass production.

# Process Introduction

## Exceptional Attention to all Processes

The quality of the product can only be achieved through fine and detailed work. This is a fact common to all products from general cast products to T-casting and direct casting, which were realized by making full use of the latest technologies. Naturally, it is essential to build a structure where equipment and instruments can be introduced in order to achieve high quality, and implement maintenance so that the best performance is demonstrated at all times in every possible work process. However, we believe that this alone is not completely sufficient. The quality of Tokorozawa Alloy Foundry has only been maintained by the high skill of every engineer related to all work processes, from the data processing of engineering drawings to the completion of the final inspection.



1

Data Processing

2

Wooden Mold Production

Based on the engineering drawings provided by customers, we perform data processing so that castings of the highest quality can be performed. The completion of sufficiently examined designs is the first step in satisfying the requirements of the customer. This technique can be achieved with the know-how produced from abundant experience and ideas, not only relying on state of the art computers.



Designs are used to create wooden molds, by state of the art 3D machining and experienced craftsmen. Needless to say, the level of detail of the wooden molds which greatly influences the completeness of the product cannot be produced without the craftsmen who understand the main technical points in the subsequent production of the sand mold and casting process. This process greatly influences the quality of the finished product.







### 3 Sand Mold Production

Sand molds are produced using a high quality casting sand which is suited to the process. The sand mold is completed after each mold is carefully inspected for both hand molding and machine molding defects/errors. The completed sand mold is carefully assembled in preparation for the molten bath.

### 4 Molten Alloy Pouring

Molten Alloy adjusted to the alloy, which meets the conditions required when completed as a product, is poured into the sand mold. The temperature of the molten bath is finely adjusted according to the type of alloy and the shape of the sand mold. It is then poured into the mold at an appropriate speed using a gravity die casting process, or a low pressure die casting process.

### 5 Sand Cast Removal

After the molten alloy in the sand mold hardens sufficiently, the sand mold is broken down and the product is removed. Although this seems like simple work, it is necessary to pay careful attention so that the product is not damaged. The remaining casting sand is then carefully removed from the complicated molded portions.

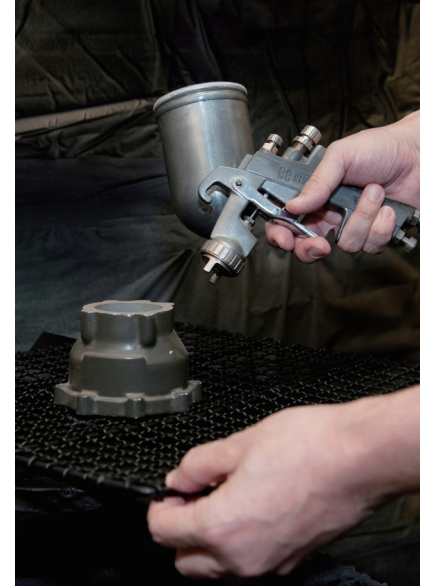




# In order to reach the best quality

## Method Names

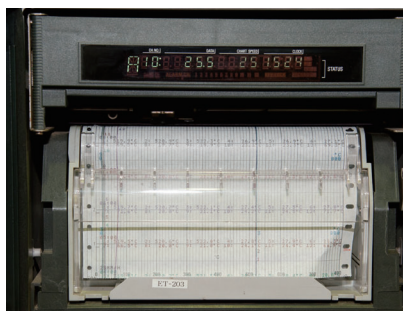
Mg Sand Casting | Al Sand Casting | LP Casting | GDC



The portions not required for the product, such as the burrs, which occur during the assembly of the sand-mold, and risers are removed. Since all the finishing to meet the dimensions on the engineering drawing is performed by the hands of experienced employees, the inspection of products can also be performed at the same time.

Heat treatment is performed on the products which have surface hardness requirements, in order to acquire the necessary hardness. Since heat treatment is performed by calculating the temperature, time, etc. based on the shape and capacity of the product using a fully automated dedicated furnace, an ideal surface hardness can be acquired reliably.

Coating is generally performed for the purpose of decoration, protection or rust protection of the product. Tokorozawa Alloy Foundry mainly uses a "spray coating" (a coating which is sprayed in a mist with high pressure air) and a "baking coating" (a spray coating which is generally sprayed for 30 minutes or more at a temperature of 120 to 200 °C).







9

## Material Inspection

10

## Precision Machining

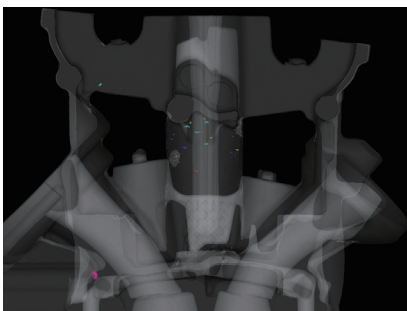
11

## Final Inspection

Material inspections are performed in this stage, regardless of the use of heat treatment. A fiberscope is used for the portions which are not visible from the frontside of the product. A color check is also performed at the same time, to prevent the overlooking of cracks in micro units generated in the product.

For products which require precision processing accuracy, we perform precision machine processing using CNC and other milling machines. We have established a structure which makes it possible for us to handle orders with extremely high precision dimensions, such as sliding parts in engines.

Products which have completed all processes go through a final inspection by dedicated inspectors, using a 3 dimensional coordinate measuring machine. Only products which pass this extremely strict inspection process are allowed to be shipped to customers as a quality product of Tokorozawa Alloy Foundry.



## Introducing X Ray CT Scanner

### Credibility Guarantee

For use in non-destructive, non-invasive, high precision scanning to create highly detailed images of interior surfaces.

### Scan Cost Reduction

Compared to previous destructive inspection methods this technology enables accurate inspection of interior areas with a wide range of cost savings.

### Improvement of Casting Methods

According to the use of software for the analysis of thickness, cost planning and comparisons with actual measurements we are able to improve casting methods.

## History

<b>Sept., 1969</b>	Tokorozawa Alloy Foundry Co,Ltd. founded. The headquarters were located at Ooaza-Shimoyasumatsu, Tokorozawa-shi, Saitama-ken. Capital : 3 million yen.
<b>Oct., 1981</b>	The Yamagata factory was built in Aratani, Tendo-shi, Yamagata-ken. Capital : 11 million yen.
<b>May, 1983</b>	The main factory was moved to Matsugou, Tokorozawa-shi, Saitama-ken.
<b>Dec., 1987</b>	Founded TK Engineering for machine work. Capital : 3 million yen.
<b>Jan., 1990</b>	The Yamagata factory was moved to Hitoichi-machi, Tendo-shi, Yamagata-ken.
<b>Sept., 1993</b>	The headquarters office was moved to Matsugou, Tokorozawa-shi, Saitama-ken.
<b>Dec., 1995</b>	Capital increase. Capital : 10 million yen.
<b>July, 1996</b>	Started manufacturing business of wooden molds for metallic casting. (CAD/CAM)
<b>Mar., 1999</b>	Built the Yamagata factory in Hitoichi-machi, Tendo-shi, Yamagata-ken for starting a high-volume production of metallic mold casting.
<b>Sept., 2006</b>	Built the second Yamagata factory.
<b>Oct., 2006</b>	Certified ISO14001 : 2004. TK Engineering: The headquarters and factory. Tokorozawa Alloy Foundry Co,Ltd.The headquarters and the main factory.
<b>July, 2008</b>	Built a new main factory.
<b>May, 2009</b>	Certified ISO9001 : 2008. Tokorozawa Alloy Foundry Co,Ltd.The headquarter (sales department only) and the second Yamagata factory.
<b>Sept., 2010</b>	Built a new office building for the headquarters.
<b>Sept., 2013</b>	Koji Ikeda appointed President & CEO
<b>May, 2016</b>	A new building was built to support operations of the Yamagata second factory.
<b>Nov., 2017</b>	Introduction of the new X-ray CT scanner.

## Outline

<b>Company Name</b>	Tokorozawa Alloy Foundry Co,Ltd.
<b>Address</b>	154 Ooaza Matsugou, Tokorozawa-shi, Saitama-ken, Japan 359-0027
<b>Capital</b>	10 million yen
<b>Director</b>	CEO Koji Ikeda
<b>Incorporated</b>	September 18, 1969
<b>Business Contents</b>	Auto Parts, Motorcycle parts, Optical Machinery Parts, Robotics Related Parts, Other Casting
<b>Business Locations</b>	[Head Office / Main Factory] 154 Ooaza Matsugou, Tokorozawa-shi, Saitama-ken, Japan 359-0027 Tel: 04-2944-0415 / Fax: 04-2944-7167 [Yamagata First Factory] 1436-4- OoazaKurazou, Tendo-shi, Yamagata-ken, Japan 994-0044 Tel: 023-653-5331 / Fax: 023-653-5332 [Yamagata Second Factory] 4-1-56 Hitoichi-machi, Tendo-shi, Yamagata-ken, Japan 994-0044





## **Main Factory**

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154 Ooaza Matsugou, Tokorozawa-shi,  
Saitama-ken, Japan 359-0027

Tel : 04-2944-0415 (Rep)

Fax : 04-2944-7167



## **Yamagata First Factory**

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1436-4 Ooaza Kurazou, Tendo-shi,  
Yamagata-ken, Japan 994-0075

Tel : 023-653-5331

Fax : 023-653-5332



## **Yamagata Second Factory**

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4-1-56 Hitoichi-machi, Tendo-shi,  
Yamagata-ken, Japan 994-0044

Tel : 023-658-7631

Fax : 023-658-7632

# TOKOROZAWA ALLOY FOUNDRY



所沢軽合金株本社及び本社工場



所沢軽合金株本社(営業部のみ)  
及び山形第2工場

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