

## 1. Using our MIM, it is possible to produce copper-based micro parts.

We also make possible improvement of production material yield, together with mass production of delicate shapes that are difficult to machine.

With MIM we produce the components by sintering metal powder, and it is a characteristic of the sintering process that a wider range of materials can be used. It is not simply a matter of being able to produce by changing the powder; we must optimise the conditions of each process in accordance with each material powder. Taisei Kogyo's Research and Development department is constantly striving to meet the challenge to introduce new materials.

This time, we will introduce copper products. Copper is a metal that is an excellent conductor of both electricity and heat, and is used in electronic equipment and other various applications. At Taisei Kogyo, we have received many requests for consultation in relation to mass-production problem using cutting such as, poor material yield of expensive material or difficult-to-cut parts of complex shape, for example, nozzles for spraying high-temperature bodies, heat sinks, complex electronic equipment parts and so forth.



▲Copper electronic components by MIM

We support pure copper, nickel, cupronickel, nickel silver, and other copper-based materials. We would especially like to draw your attention to a material for which we have succeeded in independently developing the processing method, i.e. a diamond-copper powder compound.

By mixing and sintering diamond powder and copper powder in this technology, we have succeeded in further raising thermal conductivity above that of conventional copper-based alloys. Using this copper powder + diamond powder mix, we can produce parts of higher thermal conductivity than copper alone.

Here at Taisei Kogyo, in response to inquiries such as, "Can you make very small parts with this kind of material?", "Can you incorporate these kinds of qualities into the parts?" etc., we strive together with our customers from the beginning to develop with our best technology for you, so please do not hesitate to let us know your needs.

## 2. Techniques for manufacturing external parts using MIM

Things were impossible with conventional MIM can be possible with our μ-MIM.

One question frequently asked is about the exterior use of MIM products.

When we do MIM, using the same technique as in resin moulding, a mixture of resin and metal powder is injected into the mould, giving us the shape. In the case of MIM the same problems arise as when we do resin moulding, for example parting lines, jetting and sink marks will appear on the parts. Even when doing MIM, it is important to consider how to prevent these problems at the design stage.

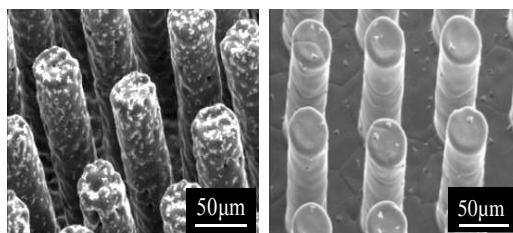


▲This cam was machined in 4 parts but now made by MIM as 1 part, thus cutting costs dramatically

Furthermore, there are many inquiries in relation to the exterior appearance associated with the use of MIM specific metal powder.

MIM is a high-density sintered body of metal powder, and the finished surface is pear skin textured. It is also possible to finish up to a mirror state by adding secondary processing from here, but in the case of typical MIM, even if the strength of the parts is not a problem, it will be difficult to apply to exterior parts and functional parts of which the surface finish is important.

In response to this challenge, we have developed MIM manufacturing technology based on metal powder of even finer particle size (particle diameter). When you use a smaller particle size the degree of difficulty and material prices go up, but you can gain a smooth surface such as can be seen in the SEM image below. It becomes possible to reduce surface roughness, and parting lines, etc. can be suppressed to a level that does not affect the exterior appearance. Taisei Kogyo technology can produce exterior parts and functional parts that were impossible with the conventional MIM. We look forward to your inquiry regarding high-performance MIM parts.



▲Surface of each particle diameter 9μm (left), 3μm (right)

## 3. MIM technology seminars

You will understand the point of the latest technology and parts design.

Taisei Kogyo hosts seminars on MIM technology for designers and developers.

We explain the technology by presenting actual examples, which should be conducive to resolving uncertainties and problems such as:

- being interested in MIM but not understanding the relevant principles and capacity;
- having used MIM but the quality is not stable.

We will teach you the essential elements of MIM parts design, including the improvement of accuracy and trouble prevention.

If you interested in this our basics of MIM seminars, please contact us.



## TAISEI Column



At Taisei's bowling tournament: I am on the back left.

Hello, my name is Yota Kanaya, where I am in charge of manufacturing process management and the technical window for our customers in Thailand. I like pachinko. I like it so much that rather than a hobby it seems to be my life work. The photograph above shows our company bowling tournament. I am also good at bowling. Because we also use sphere-shaped metal powder in MIM, I seem to be connected by fate to round objects!