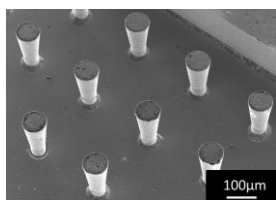


## The reason why μ-MIM is chosen

Inquiries are coming to Taisei Kogyo not only from Japan but from all over the world looking for higher standard MIM technology. The reasons why μ-MIM is selected by engineers looking for such high-grade specifications and quality are explained in this edition.

### ① Mass-production of the shapes that cannot be processed by CNC machining

Is it good to process any parts by MIM? It is not like that. The shapes suitable for CNC machining and suitable for MIM are different. MIM brings out the strength when the shapes, which have high costs or impossible to process by CNC machining, are mass-produced. CNC machining is the most typical processing method in the microfabrication or high-precision processing. However, it has a limit in mass-production because it is processed using tools. It can process only small lot, however it requires a long period and high cost in the mass-production. There are also many cases where the manufacturing itself is impossible by the restrictions in its processes.



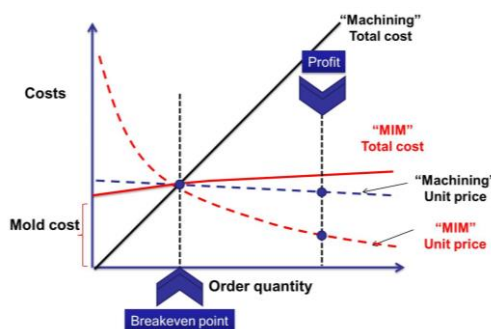
▲Reverse tapered pillars ▲Cross-sectional image

For example, the above photograph at a glance looks like micro-pillar made of stainless steel that has been introduced before (100μm diameter, 200μm high pillar structure). However, it is a reversed taper as shown in the sectional pattern diagrams (right), and it is an impossible shape for normal mass-production not only by CNC machining.

By the application of this shape to the surface of the products, strong adhesion can be expected from the anchor effect at the part in the products where connection between different materials (rubber or plastic and metal) is required. In the electrochemical application such as electrode or power collectors, specific contact area and surface area can be maintained at the same time

### ② Realizing diversion to advanced manufacturing from other methods

It is important that MIM is understood as a manufacturing technology suitable for mass-production. For example, considerable initial costs per piece are required in the production of 10 to 100 pieces. On the other hand, mass-production by MIM becomes a merit if 1000, 10000 or 100000 pieces are produced in one lot as shown on below chart comparing with the production by other methods.

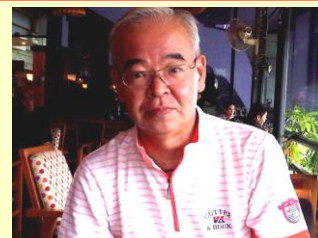


▲Image of production costs variation by MIM

Along with the increase in recognition of MIM technology, people who compare MIM and 3D printer have been increasing. However, the field of MIM production volume does not overlap with the field of 3D printer, which is realistic to produce up to 100 pieces per lot. Diversion from CNC machining, presswork or sheet metal work to MIM is often considered. However, if MIM is applied to 2.5 dimensional parts,

which presswork or sheet metal work can be conducted, there will be no cost saving. Where merits of MIM application can be benefited are the cases where "CNC machining is used even at high cost because it cannot be manufactured by other methods". In these cases, the level of accuracy, complex shape or non-conventional material are difficult to be realised by conventional MIM manufacturers. The difference between conventional MIM and Taisei Kogyo's μ-MIM is that the comparison of the costs in the chart (left) can be applied not only to the parts manufactured by CNC machining but also to mechanical parts with high added value parts (complex 3D shape and wide range of materials). That is to say, the higher the price of CNC machined parts is, the higher the possibility to reduce cost in mass-production using Taisei Kogyo's μ-MIM technology. Please do not hesitate to consult with us when you have idea to realise complex metal parts!

## Taisei Column



My name is Yoshitaka Nishihira. I am rather old, but at Taisei Kogyo, I am still a newcomer. My work is mainly to make the feedstock by kneading the material in the production department. My motto is "If the preparation stage is good, all will go well!". I do my best to perform this process smoothly and provide uniform quality material to the next process. In my youth, I was in a music band where I used to sing and play drums. At the time, we played mixed songs such as anti-war songs, rock "n" roll, folk songs, etc. I even used to have long hair! Recently my leisure time is spent with my grandchildren going to amusement park, sometimes queuing for 3 hours with them. I was exhausted but they became friends with some foreign visitors conversing with gestures. I was very impressed and felt we indeed live in a global era.