

# Metal Injection Molding Technical Newsletter

World's Finest MIM Technology from Japan "μ-MIM®"

Volume 11

Issued by : TAISEI KOGYO CO., LTD.

## 1. Mould-less MIM prototype achieved

Reduce mould cost and shorten delivery times for MIM prototyping with new technology

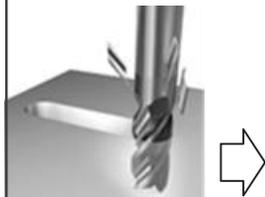
In MIM production, it is necessary to make a mould. Thus, unfortunately, it was unavoidable to spend long leading time and certain amount of expense for trial due to mould tooling and its cost. It was an obstacle to examine MIM prototype even it is likely that the procurement cost could be drastically lowered.

Accordingly, we have developed a method to easily try MIM parts with short lead time. In this method, a standard shape (cuboid or simple block) is injection moulded using a mould as usual (at this stage the product is referred as a "green body"). The green body is machined to the final shape and sintered to produce a MIM part. With this method, it is possible to try "mould-less" MIM parts. If you are hesitating about MIM prototypes, please contact us.

### 1. Injection mould for standard green body



### 2. Preparation of prototype cutting program for machining



### 3. Green body cutting to the final design



### 4. Prototype Green body

### 5. De-binding and sintering process.

**Realising mould less MIM prototype process**  
**⇒ less mould cost and shorter lead time**

## 2. Technology for achieving μ-MIM

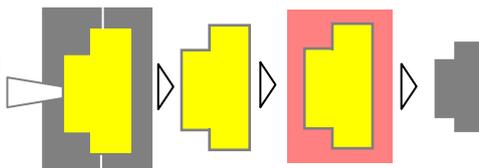
Points of μ-MIM mould that enable the

achievement of super high precision

Metal injection moulding (MIM) is a technology developed on the basis of resin injection moulding technology, so it has many points in common with resin moulding. In both resin moulding and MIM, the mould is an important factor deeply related to the shape, accuracy, etc. of the product. However, the material and the process after moulding are different between resin moulding and MIM, thus, the conditions required for the mould is also different.

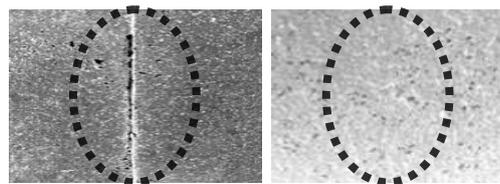
Particularly in μ - MIM moulds that realise the same accuracy as machining, it is necessary to achieve not only the high accuracy of the mould tooling but also the mould design. Since MIM products need the sintering process and it is impossible to avoid the shrinkage during sintering therefore it is also important how to design the mould.

**Injection moulding**   **Compact part**   **Sintered part**   **Finished part**



▲ Need to simulate from the finished

In addition, metal parts by μ-MIM must solve the problem of the parting line which is unavoidable in injection moulding. Usually, the parting line will appear at the interface of cavity plate and core plate. However, μ-MIM can suppress the parting line to a level that is inconspicuous not only to the naked eye but even under a microscope.



▲ Parting line of regular MIM (left) and μ-MIM (right)

Certainly, it is required numbers of know-how and high mould fabrication technology to manufacture the m-MIM mould.

We have been working for more than 20 years with excellent mould manufacturers to accumulate experiences and technologies for ultrahigh precision MIM mould fabrication.

If you are considering converting from machining to MIM, or interested in higher level of precision, elimination of post processing of present MIM products please contact us.

## 3. Introduction of example of surface modification of MIM

Considering exterior parts and functional parts

At Taisei we have also accumulated technology on surface modification of MIM. It is required various functions and performances for the MIM surfaces, especially when the part is used as an exterior or contacting with fluids or other objects.

Besides the examples of hairline processing and mirror surface treatment below, there are examples such as surface hardness improvement by coating (Vickers hardness 1000 or more) or mirror surface finishing (Rz 1.6) of titanium parts.

In the case of surface modification of MIM parts, we guarantee the product quality, including processing quality at cooperating companies.



▲ MIM part hairline processing surface



▲ MIM part mirror finishing surface

### Taisei column



Mrs.Okamura: Tokyo Office

Hello, my name is Noriko OKAMURA. At our Tokyo office, I handle communication with customers in Tokyo area and other business. The picture shows me with an Austrian student who came to do a home-stay. We accepted the student at our house to give our kids (and me) international experience. At the beginning we could hardly understand each other, so it was quite difficult time. What we all could use was only body language. But now we have very good memories of that experience.