Micro Metal Injection Moulding

Technical NEWSLETTER

Micro MIM Japan Holdings Inc.

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Mould and moulding process

Moulding process is the only process that gives shape in whole MIM process. Therefore, our accumulated μ-MIM technology know-how or intellectual properties are applied most intensively for the mould design and moulding process.

Mould determines not only product design but mechanical properties

Micro MIM Japan manufactures gears nozzles or many types of product, thus, mould tooling is done by mould manufacturers who have the world-class technology for each product type.

Similar to plastic molding, the green parts have, 1) parting line (PL) that appears along the interface where the mould opens, 2) materials gate marks for inject the material into the cavity, 3) ejection pin marks, when the product is removed from the mould. However, the products we handle are often in shapes and sizes that make it difficult to do post processing such as machining, thus it is required to make these traces as small as possible and not to affect the product properties. We design moulds with mould manufacturers based on μ-MIM technology which has cultivated in plastic molding experiences.

The figure shows an example of helical gear. This product's mould is dividing into multiple pieces to eject the green part. Multiple mould divisions realise more complex design production, however, the PL increases accordingly. Although there is a PL, it has achieved a level that cannot be confirmed visually by μ-MIM technology. PL is at the arrow in the figure, magnified 2.5 times. In addition, our PL is not be distinguished by electron microscope (SEM) observation.

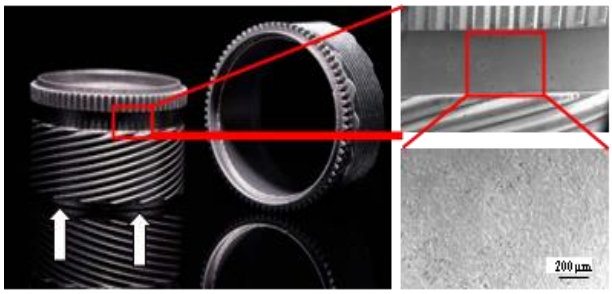

Fig. (Left) Helical and spur integrated gear using multi-part mould (Right) SEM observation image of the integrated gear at the PL

The surface roughness of the product greatly depends on the surface roughness of the mold in addition to the selection of the material powder, introduced previously. The smaller the parts are the more difficult post-processing, thus, it is necessary to achieve the required surface roughness using only the mould and powder. Also, the feedstock fluidity affects the mechanical properties of the final product. Manufacturing moulds with properly controlled surface roughness leads to improved quality of MIM products without sacrificing productivity. It is one of the important keys tocorporate to the world's top-class mould manufacturers that can respond to our demands to realise the complicated design small MIM mass production.

Unique moulding experiences in the MIM industry

We were founded as a plastic injection moulding manufacture. During high economic growth in 1960s and 1970s, we have experienced most of plastic materials and methods to meet the demands. Therefore, we are absolutely confident in moulding technique unlike other MIM manufacture, founded based on metal-related businesses.

Compared with plastic injection moulding, MIM green parts are brittle so there are more restrictions in injection process. However, we believe "MIM can do if plastic injection moulding can do", thus, we are working hard on development of new moulding technology.

Exhibition

34th NEPCON JAPAN R&D and Manufacturing

We exhibit Nepcon Japan as a part of Micro Manufacturing Association
Date: 15-17 January 2020
Venue: Tokyo Big Sight (West hall) Booth: W6-32

Column

I am Junya Ishida from moulding section in manufacturing department. I have been working here since December 2018 and before that I was in Mie prefecture working as a maintenance engineer of manufacturing machine. Currently, I am responsible of injection moulding in mass-production section thus I work accordingly both in usual and in trouble occasion. It is quite different from previous work thus every day I found new things and I am enjoying that. On holidays, I take a walk with my dog or motorcycle out in distance to develop a delicious restaurant.