



Super Engineering Plastics

Our ultraprecision injection-molded parts support the manufacturing with competitive advantage.

Nichiei excels at molding of high-function ultraprecision parts of engineering plastics or super engineering plastics to support the development of high-value-added products in the industry.

Substitute plastics for metals

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Lower cost

Light weight

High function Heat resistance / wear resistance / sliding performance

We have an integrated system from trial production to die/injection molding within the company to respond to your needs.

Die technology

We have rich experience and knowledge on the design and manufacturing technology that support the foundation of the precision molded products. We provide an optimal process through a lean manufacturing of the die with a focus on the molded products.

Fields to cover

We have many results in the parts for the automobile, OA, AV, optic, medical, and information and communication equipment. Please feel free to contact us for the possibility of using a high-function plastic in the development of a new product in your company.

Molding technology

Our molding technology is based on the stable mass production of JIS Grade 1 or JGMA Grade 0 with a helical gear. Our sophisticated technology for super engineering plastics can add high value to your process.

Materials to cover

We provide the comprehensive support from selecting of material and consulting, aiming to reasonably achieve the required specifications.

[Super Engineering Plastics]
PI, PEEK, PES, PPS, PAI, and more
[General-purpose Engineering Plastics]
POM, PET, PBT, PC, LCP, PA, and more
Our original molding technology can support new materials and compound materials.

We challenge to a difficult processing as an expert in the field of superprecision injection molding.

1. Plastic shaft bearing with the deflection tolerance for the internal and external diameter of 0.005

A customer used cutting processing in the manufacturing to meet the specifications in the early stage of the development, and later, they used wet polishing processing. However, they were struggling to satisfy the specifications. Then, we received inquiries from them and recommended the processing by injection molding. One of the characteristics of a crystalline resin is the shrinkage that starts immediately after the molding. Considering the properties of the products, they are not usable if they have the post-molding shrinkage. To solve this problem, the customer and we produced a measuring machine dedicated to the same machine tolerance and observed the variation with time in 1 month, 3 months, 6 months and 1 year after molding. After confirming that there was no change in dimensions, the mass production was started. Considering the capacity of the work process, the die for 4 four pieces with the tolerance of $2\ \mu\text{m} \sim 3\ \mu\text{m}$ supports maximum monthly production of 300,000 bearing shafts during mass production.

DATA

Usage: Bearing shaft for OA equipment / Material: POM / Die for: 4 pieces / Reason of development: New development

2. Thick-walled bearing shaft: Coaxiality tolerance of 0.01

A customer used cutting processing in the mass production to meet the specifications in the early stage of the development. The process was time-consuming and costly and had some problems in the quality. We received inquiries from them and recommended the processing by injection molding. If the wall thickness is big, a molded product has a molding failure, which is called "sink marks", which becomes a problem to be solved before inspecting the dimensional accuracy. As a matter of fact, the molding with the coaxiality within 0.01 is an extremely difficult processing. We have solved all of these problems and realized the pass production.

DATA

Usage: Bearing shaft for OA equipment / Material: POM / Die for: 1 piece / Reason of development: Replacing of the cut products (to improve quality)

3. Plastic bearing shaft: Circularity of 0.002; External diameter tolerance range of 0.008

A customer was struggling to achieve high specifications in the molding requiring the circularity of 0.002 and the external diameter tolerance range of 0.008. We offered an original molding method meeting both functional and specification conditions and realized the molding products that satisfied the customer.

DATA

Usage: Bearing shaft for OA equipment / Material: Liquid crystalline polymer / Die for: 4 pieces / Reason of development: New development (trial production)

4. Insert gear of JGMA Grade 0

A customer investigated an internal diameter insert gear to make their OA products silent. The coaxiality of the shaft and teeth is critical for a gear. Inserting is not successful unless there is clearance between the internal diameter fitting and the die. (However, the clearance where the fitting is not inserted in the die causes the coaxiality loss for the fitting and the gear. The dilemma is that JGMA Grade 0 will not be realized under such condition.) We have developed a new (patented) molding method to realize a gear with the accuracy maintained in the insert molding.

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Usage: Gear for OA equipment / Material: POM, elastomer / Die for: 4 pieces / Reason of development: To make the products silent



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5. Super-small screw

We manufactured this product to respond to a demand for substituting for an extremely small metal screw. The screw is so small that the strength for the screw thread is not satisfied by a normal plastic. Therefore, we manufactured the screws with PEEK or other super engineering plastics.

DATA

Material: PEEK, etc. / Die for: 1 piece / Reason of development: Trial production

6. Super small module gear

A manufacturer in the cell phone industry examined a super-small module gear. As the teeth are so small and torque is applied, a normal engineering plastic is not suitable. We selected and recommended a suitable material with a view to the purpose and conditions of use, based on the knowledge that we have accumulated on super engineering plastics over 20 years. As this is an extremely small part, the method for gate and ejector requires special knowledge.

DATA

Usage: Gear related to a cell phone / Material: PEEK / Die for: 1 piece / Reason of development: New development

7. Pipe with the internal diameter of $\phi 0.5$ and the length of 72 mm

A customer needed a funnel-shaped end for a clear pipe with the internal diameter of $\phi 0.5$ and the length of 72 mm. Also, as burring was not allowed on the opposite end, the customer was not able to employ the method by extrusion molding and cutting. We were asked for an advice and tried the injection molding method. As the injection pressure was so high, it was extremely difficult for us to keep the pin of $\phi 0.5$ standing straight during molding. Also, the length of 72 mm meant that molding was almost impossible. As a result of many trials and errors, we have completed the molded products with satisfactory degree of precision.

DATA

Usage: Trial production for medical use / Material: PES / Die for: 1 piece / Reason of development: New development

8. Super-small medical parts

The medical equipment used to be manufactured with a die. However, as the parts had direct contact with the inside of a patient's body, the parts made of metal caused a great pain. If the material is substituted by the plastics, the strain on the patients will be significantly reduced. The product was an extremely small and thin molded product, with a great difference in wall thickness, ranging from 0.07mm for the thinnest to 3 mm to the thickest. Thus, it was quite difficult to mold such a shape. As the great internal stress may cause a crack during use, a molded product with small stress is required. The pitch accuracy for the hole is 0.02 mm in the range. This is an extremely small part and the method for gate and ejector requires special knowledge.

DATA

Usage: Parts related to medical use / Material: PPSU / Die for: 1 piece / Reason of development: New development

9. Various super engineering plastic parts

Nichiei has approximately 20 years of experience in the super engineering plastics molding technology and has worked on manufacturing of various products. Particularly, we have manufactured many precision molded products of super engineering plastics such as PEEK, PI, PAI (Torlon), and PBI (Celazole), which require difficult molding method. Our molded products have been used for the bearing retainer, trochoidal pump, material handling parts in a clean room, and other parts requiring the strength to a suction disk, heat resistance, and sliding property. As the super engineering parts can substitute for the metal parts, they are expected to be employed in various types of eco-friendly equipment.

DATA

Usage: A wide variety of usage / Material: PEEK, PI, PAI, PBI, etc.



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