

Shin-Nihon Tech Inc.

Patent technology effective for the improvement of productivity of small-sized/thin-wall molding products

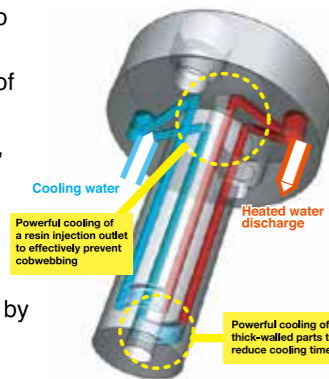
Cold sprue bushing

World's first / Japan's first

The number one performance

Feature 1 Cooling function for high-cycle molding

Cooling water that is supplied to the inside of a sprue bushing prevents a rise of temperature of a molding tool due to heat accumulation around the sprue, and as a result of this, the number of molding cycles is reduced accordingly and productivity is improved. In a molding experiment carried out by Center for Advanced Die Engineering and Technology at Gifu University, the sprue cooling time was reduced to under half that of a conventional molding tool.



Technical summary

This is a unique patent technology with the new cooling mechanism added to a sprue bushing, which is a cylindrical part for a resin flow path that connects an outlet of a molding machine with a mold tool. By setting a flow path that sufficiently supplies cooling water to areas near the injection outlet and thick-walled parts of the sprue, sprue solidification time can be substantially reduced. The powerful cooling function can restrain resin cobwebbing at the injection outlet and reduce damage to mold tools or problems such as the abnormal shutdown of molding machines caused by caught plastic during mold clamping.

Feature 2 Trouble prevention for a stable molding process

- With temperature adjustment controls for molding tools, the temperature of a molding tool can be stabilized in a short time. The quality of molding products becomes stable by restraining excessive heat build up on a molding tool on the fixed side.
- The powerful cooling function in the new method helps reduce cobwebbing, which occurs when a sprue is removed from a high-temperature resin injection outlet of a molding machine.
- Since manufacturing products with an integral structure is possible, and cooling water can be supplied from a remote location away from products, this is effective in preventing the corrosion of areas around molding products due to water leakage.

Attention

Background

When molding small-sized/thin-walled products, there was a problem with poor molding efficiency due to a longer solidification time for waste sprues than for molding products. In addition, resin cobwebbing at an injection outlet during the removal of products from molding tools was another problem. This often resulted in molding tool breakage and problems such as abnormal shutdown of molding machines.

Uniqueness

The cold sprue bushing developed by Shin-Nihon Tech Inc. has a manufacturing method, structure, and performance different from that of conventional products. Multiple parts with water passages cut in advance are connected by friction pressure welding. Vacuum hardening is applied, and then, it is finished by machining. This realized a substantial reduction in time taken for connecting parts and the number of components used. In addition, since stainless materials are used, it is effective when using resin, which generates corrosive gases, and this is also effective for the improvement of corrosion resistance/durability of areas around molding products.

Future business development

We have addressed the prevention of problems related to molding tools and the achievement of long-life products while dealing with various issues such as heat, hardness, and surface treatment based on our high-precision processing technology. We will incorporate customers' opinions to continue to manufacture products which contribute to the improvement of productivity.

A new technology that challenges the fundamental issues with pressing

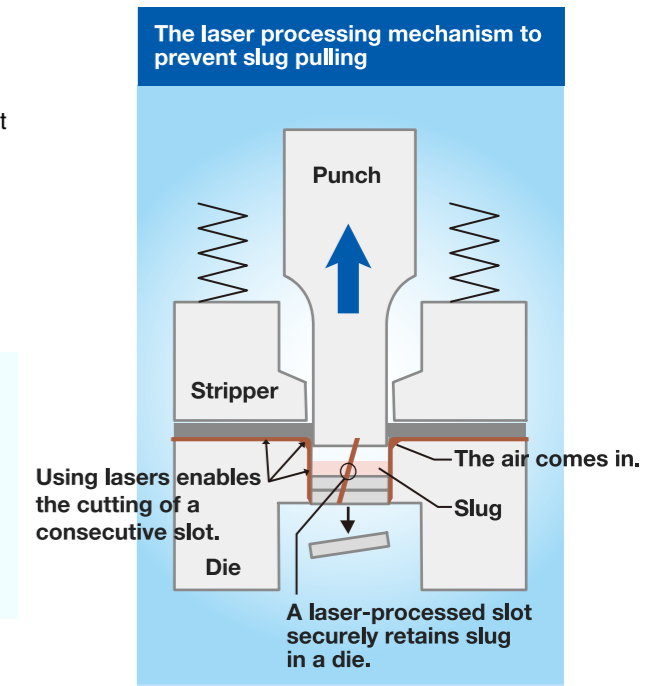
Laser processing of slug pulling prevention

Pressing spread as a means of quickly manufacturing the same products in bulk. However, "slug pulling", which is generated during stamping operations, has been a challenge that has remained throughout. Our "laser processing of slug pulling prevention" is a revolutionary new technology that will finally address this issue.

Trying to prevent slug pulling with a fine laser-processed slot

"Slug pulling" is a phenomenon in which slug generated during stamping operations is not retained in a die, but floats above from the die as a punch goes up. As stamping operations can be done faster and pressed materials get thinner, the frequency that slug pulling occurs increases. This causes die breakage, poor pressing quality, and concern for the many people involved. Shin-Nihon Tech Inc. uses its own laser processing technology to cut a fine corrugated slot on the wall surface of a die (female die) in advance. The concave part lets the air go into a die and the convex part retains slug to effectively prevent slug pulling.

The figure shows the mechanism of the laser processing that successfully prevented slug pulling. With this mechanism, slug attaches to a punch (male die) that functions as an edged tool. Laser processing is applied to cut a corrugated slot on a die (female die) so that the die retains slug and the frequency of slug pulling during fast stamping operations on thin plates is substantially reduced.



Reduced maintenance work improves productivity.

We have received a great many comments from customers who adopted laser processing of slug pulling prevention, some of which are as follows; "Though we used to polish dies every 50,000 to 200,000 stamps, now we polish them every 2.8 million stamps and still find no slug pulling. This has substantially reduced maintenance man-hours." "Having no slug pulling drastically improved our productivity." In addition, split molding dies and integral dies with wire-cut electrical discharge machining can be also processed using this method. Furthermore, since you do not have to create dies separately to prevent slug pulling, a smaller die structure and cost savings can be achieved.

Laser-processed molding die for the prevention of "slug pulling"



Laser-processed areas

This is one example of measures to prevent slug pulling with a die which has a slot of 0.8 mm in width and was made by using wire-cut electrical discharge machining. There is a laser-processed slot of 0.2 – 0.3 mm in width in a part of the die. Compared to the conventional measures against slug pulling, in which complicated projections and inclinations are put on dies, man-hours for processing and costs can be saved.

Company outline/Basic information (as of January, 2012)

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Employees: 75
Capital: 100 million yen
Established: 1953
Representative: Yasuo Izumi,
President

Business description:
Manufacturing of super-precision molding parts for electronic components and medical instruments. Design and manufacturing of plastic molding tools/press molding tools. Dedicated fluorine coating for cutting knives used for self-adhesive films