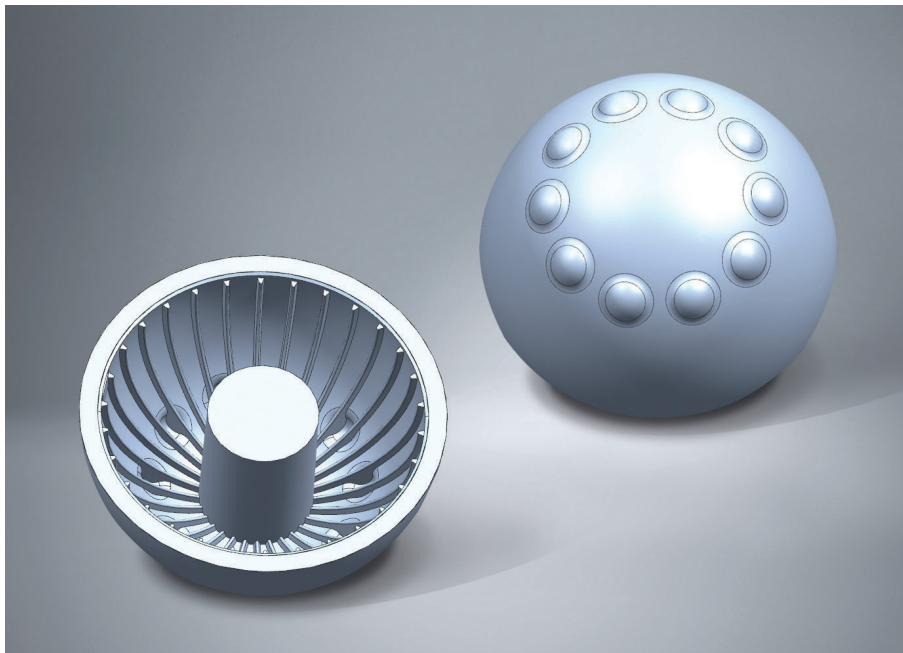


3D-Print Injection Mold Tools with Conformal Cooling System Designed for Globoid-Shaped Parts

Source: dMac Precision Technology Co., Ltd.



Injection molded globoid-shaped part using additively manufactured mold cores with conformal cooling

Challenge

Achieving a stable and efficient production output for globoid-shaped parts is one of the most common production challenges faced by the injection molding industry as traditional cooling systems with CNC machining impose limitations on globoid-shaped part.

Solution

dMac designed a conformal cooling core with runners that conform to the part shape. The uniform cooling area and a stable water flow direction through the cooling channels improves the heat dissipation and shorten the production cycle time.

Results

Cycle time shortened by 32%

Production yield increased by 48%

Lead time reduced by 33%

dMac Improves the Yield of Globoid Parts by 48 % with Additively Manufactured Injection Mold

In the highly competitive injection mold industry, designers aim to differentiate themselves with complex, value-added tools that improve customer production yields for organically shaped parts.

dMac Precision Technology Co., Ltd. is a leading engineering solution provider in Asia Pacific that designs and manufactures custom Conformal Cooling (CC) systems to improve the production yield of globoid parts. Manufacturing CC channels additively has proven to be ideal compared to CNC. dMac has successfully designed CC channels in the core of globoid molds to improve heat dissipation, thereby reducing production cycle times. With their experience in traditional mold & die design and AM know-how, dMac has successfully created a niche market demand for additively manufactured tools in the competitive Chinese tool industry.

Challenge

dMac is a 3D metal engineering solution provider in China that specializes in the design and manufacturing of complex tools for both the injection molding and die casting industries. Achieving a stable and efficient production output for globoid-shaped parts is one of the most common production challenges faced by the injection molding industry in general, as traditional cooling systems with CNC machining impose limitations on globoid-shaped parts. Due to manufacturing constraints, the runner is generally too far away from the part resulting in non-homogeneous cooling. This often results in longer cooling times and sometimes an

increase in the parts rejection rate. Many customers approached dMac to provide an engineering solution to improve their production cycle times for organically shaped parts during mass production. With their traditional mold design and additive manufacturing know-how, dMac developed an optimized conformal cooling system specially tailored to globoid-shaped parts.

Solution

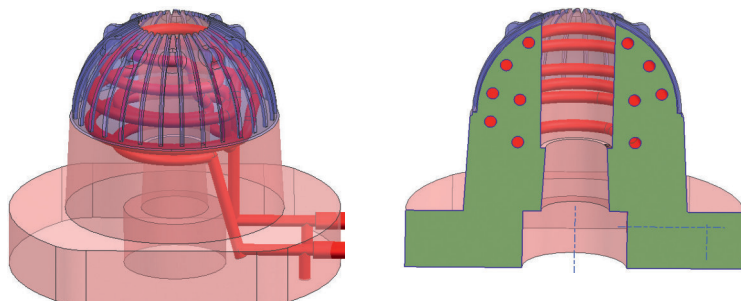
China has one of the world's biggest mold and die industries, with more than 40 000 enterprises. In 2015, as a new start-up in China, dMac successfully created and built a network of sustainable clients in the traditional mold & die industry with additive manufacturing (AM).

Short Profile

dMac Precision Technology Co., Ltd., established in 2015, is a leading one-stop engineering solution provider for metal 3D printing in Shenzhen, China. They specialize in 3D metal printing and 3D laser texturing in the mold making industry. dMac provides rapid solutions for customized metal tools from design to manufacturing and post processing.

In 2018, EOS and dMac jointly set up a Tooling AM Innovation Center to enhance the growth of additive manufacturing (AM) in China. dMac has successfully disrupted the traditional tooling industry in China with their AM capabilities and currently operates ten EOS M 290 systems to support the global demand for AM tools.

Further information
www.dmac123.com



*Conformal cooling incorporated into a globoid-shaped core insert built using 3D hybrid printing.
(Source: dMac Precision Technology Co., Ltd.)*

"dMac's business philosophy is to provide affordable metal AM to all tool makers. We don't think additive manufacturing is an emerging technology any more. We think additive manufacturing has emerged, and people are using it successfully to improve production efficiency."

*Jeffrey Koh,
Founder/CEO of dMac Precision Technology Co., Ltd.*

dMac provides one-stop engineering solutions for the design, manufacturing and post-processing of additively manufactured tools. In order to compete with traditional mold and die manufacturers, dMac decided to explore the untapped AM market. Instead of tendering for traditional manufacturing contracts, dMac focuses on helping customers address common challenges in their production lines, especially in the production of globoid-shaped parts. dMac is one of the few manufacturing bureaus in China capable of designing, manufacturing and post-processing additively manufactured tools that help customers address production yield challenges. With dMac's experience in traditional mold design and initial application support in AM process know-how provided by EOS, dMac has now created their own niche intellectual property in optimized mold design, manufacturing and post processing of AM tools with complex conformal cooling channels. dMac's strong technical support coupled with

EOS's reliable and repeatable machine process has helped dMac differentiate themselves from the mass tooling market. To date, dMac has successfully supported more than 20000 additively manufactured tools for mass production. With additive manufacturing, dMac manufactures conformal cooling systems that help manufacturers improve the production yield of globoid-shaped parts. The conformal

cooling cores have runners that conform to the part shape, with a constant average distance of 4 mm from the product surface. The advantages of having a uniform cooling area and a stable water flow direction through the cooling channels helps to improve heat dissipation and shorten the production cycle time. In addition with hybrid manufacturing, dMac further helps customers to reduce the cost of conformal cooling tools.

Results

Additive manufacturing enables tooling engineers to freely create channels within the insert that conform to the shape of the final product. The conformal runner ensures that the cooling effect is homogeneous across the total surface area of the part being molded. With their additive manufactured conformal cooling system in place, one customer reported the following advantages:

Production lot size : 300000 pcs (2 cavity mold)

Indicators	Conventional	Additive Manufacturing	Improvement with AM
Cycle Time	62 sec	42 sec	Shortened by 32%
Production Yield	2 323 pcs / day	3 428 pcs / day	Increased by 48%
Lead Time	129 days	87 days	Reduced by 33%

With Conformal Cooling AM Tool:

1. Customer saves 60000 RMB per production lot (OPEX)
2. The investment required by a conformal cooling tool is 14000 RMB (1 722 Euro). It only takes 70000 pcs to pay for itself.



(Source : dMac Precision Technology Co., Ltd.)

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