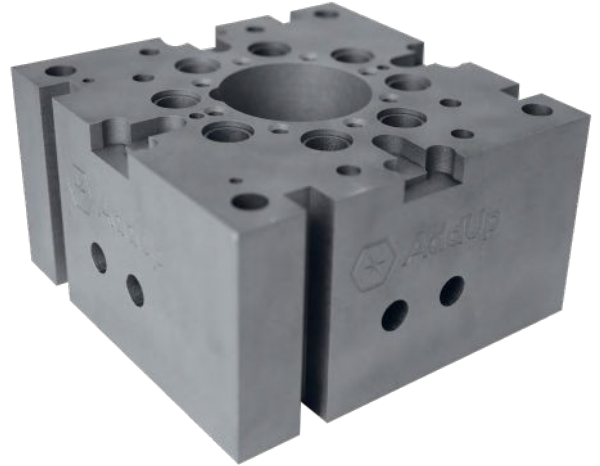


INJECTION MOLD USING ADDITIVE TECHNOLOGY

HISTORY

In the mold industry, and especially in the case of injection molds, short injection times are crucial for profitability. They decide how many injections molding machines and molds you need and how high the final price of the part will be. The cooling system in the contour core insert has the greatest influence on these times. Today, the cooling channels are often still produced conventionally by drilling in 2D and cannot always run close to the contour and thus cool evenly and quickly.

Zahoransky AG, headquartered in Todtnau-Geschwend, Baden-Württemberg (Germany), is a manufacturer of injection molds, blister packaging machines, and above all production equipment. Zahoransky is the world market leader in mold and toolmaking for the toothbrush industry. Around 80 percent of the world's toothbrush molds come from Zahoransky.



CHALLENGES

Zahoransky needed a mold insert with eight bores with mold rings. Up to now, these have had to be well cooled and elaborately sealed by means of O-rings. The challenge was to improve the cooling of the inserts using additive technology in such a way that the cycle times and productivity of the molds would be significantly increased. The complex assembly of the O-rings was to be eliminated, thus enabling a reduction in manufacturing costs.

The quality of the parts was to be maintained in the usual form. And, in addition, the molds needed to be constructed with a steel material qualified for injection molding and had the corrosion and wear resistance for this production.

INDUSTRY

Tooling



CHALLENGE

To improve the cooling of the inserts on a mold using AM technology while increasing the performance of the mold and decreasing the cycle time.

KEY BENEFITS

- ◆ Ready to use mold after heat treatment
- ◆ Near contour cooling in the insert
- ◆ Reduction of time & cost production



CREATIVE
SHAPE



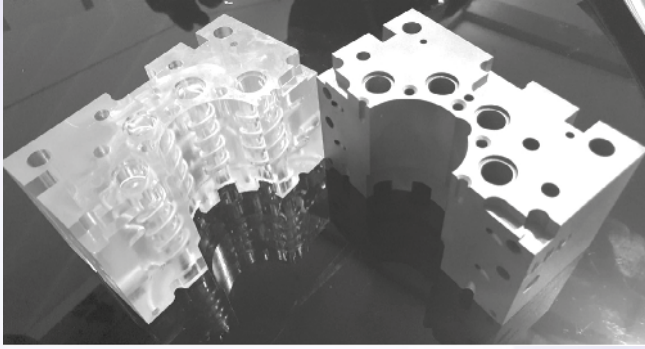
FUNCTION
INTEGRATION



LEAD
TIME



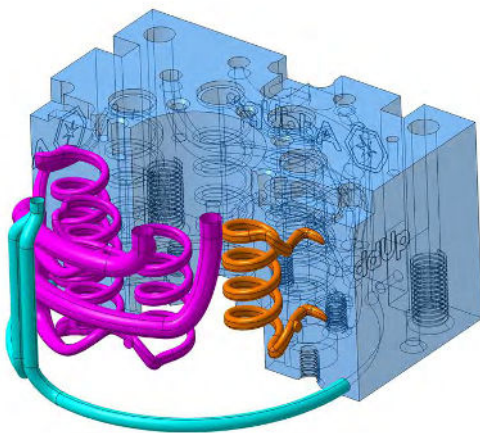
PERFORMANCE



SOLUTION

AddUp optimized the cooling channels and designed as closely as possible to the original contours using AM 3D options, including unique AddUp Manager adaptive strategies skills.. It was particularly important that all channels had the same length and the same cooling capacity to ensure uniform cooling in use. AddUp utilized simulation software and thermal design optimization to ensure accurate and uniform cooling for this mold.

Next, the new mold was printed on AddUp's PBF machine (Laser Powder Bed Fusion), the FormUp[®] 350 New Generation using a productive AM build-up strategy with 4 lasers. This mold was printed in just 30 hours.



CAD: complex channels inside the part

RESULTS

AddUp significantly reduced the production time for this mold when compared to traditional manufacturing time. Post processing for this mold was also greatly reduced thanks to the roller technology offered on the AddUp FormUp 350.

AddUp's unique combination of fine powder and a roller recoater provide superior surface finish, which greatly reduces the time needed for post processing. The mold printed using a steel material 1.2709/ Margin300. This material is a qualified tool steel offering good tool life in the mold.

Zahoransky was pleased with the quality of the mold as well as the production time.

The next step in this project is for another prototype to be manufactured with additional optimizations and in a newly developed tool steel 1.2083/PM420. This new material is a qualified injection molding steel that is widely used and offers good corrosion and wear resistance.



Tooling for the manufacture of pipette tips, with a double quick-change system. Each heating element can be removed individually in no time

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