Press Release

3D Print Head Prints Miniaturized Pneumatic Actuators

vipro-HEAD achieves new precision in Soft Robotics

**The areas of application for Soft Robotics are still in their infancy, but the potential is promisingly large. As part of an in-house test, the vipro-HEAD 3D print head from ViscoTec was able to print a very small, sophisticated pneumatic actuator - a so-called Soft Gripper.**

Robots are an integral part of industry these days and it is hard to imagine production facilities without them. However, their use requires strict safety measures, especially when they come into contact with people. A new generation of robots drastically minimizes the risk of injury and offers other advantages: These new robots are made of a flexible material, such as silicone. The movement of the robot is created by a specific filling and emptying of cavities (often using compressed air or vacuum).

An example of a soft robot already used in industry is the so-called pneumatic gripper. These actuators are characterized in particular by their high flexibility in gripping shapes and the non-destructive handling of fragile objects.

However, the production of these flexible grippers is a challenge. The complex geometries and the many cavities make injection molding very complex or, in some cases, impossible. This can be remedied by using additive manufacturing and its immense design flexibility. Thanks to the high degree of automation in 3D printing, a change in geometry can be achieved with little effort. This makes the process perfectly suited for researching and testing new gripper concepts.

Successful tests with silicone

Here is what happened in the ViscoTec 3D technical center. Essential for successful printing is the extremely precise processing of the desired material, which is mainly silicone in the case of the Soft Gripper. The vipro-HEAD 3/3 or 5/5 is capable of creating particularly fine structures from silicone - with a layer thickness of 0.2 mm. By actively retracting the material, no material drips into unwanted areas and a completely airtight component is achieved. The result of the initial tests: With the help of the vipro-HEAD 3/3 or 5/5, pneumatic actuators with very small dimensions can be produced. High-precision, additive-manufactured functional components made of silicone.

This video shows the production of the flexible gripper: <https://www.youtube.com/watch?v=jrY5PKlul4Q>

Great potential for future Soft Robotics applications

Particularly in the field of medical technology, the application possibilities of the miniature grippers are intensively tested. For example, in the area of medically minimally invasive procedures, the lower risk of injury from the "gentle" robot is a significant advantage over tools made of metal. For this reason, medical grade silicone was also used for the tests at ViscoTec to meet such requirements.

For more information about the high-precision 3D printheads from the dosing technology expert, click here: <https://www.viscotec.de/en/industry-applications/3d-printing/>

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Images:

 

The result of the first tests with the ViscoTec 3D print heads is a pneumatic actuator with very small dimensions.

ViscoTec – Perfectly dosed!

ViscoTec Pumpen- u. Dosiertechnik GmbH manufactures systems required for conveying, dosing, applying, filling, and emptying medium to high-viscosity fluids. The headquarters is in Töging a. Inn (Bavaria). ViscoTec has subsidiaries in the USA, in China, Singapore, India and in France and employs about 260 people worldwide. Numerous sales partners all over the world complete the international distribution network. Next to technically sophisticated solutions to even the most complicated application, ViscoTec is the single point of contact to deliver all components for a complete system: From emptying to preparing and to dosing. This guarantees successful interaction of all components. All fluids showing a viscosity of up to 7.000.000 mPas can be conveyed and dosed almost pulsation-free and with extremely low shear. ViscoTec offers comprehensive consulting for every application and, if required, extensive tests will be carried out in close cooperation with the customer. The dosing pumps and systems are perfectly adapted to their respective application whether it is the food sector, the e-mobility industry, the aerospace field, the medical technology, the pharmaceutical industry, or many other branches.

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