

Architectural products safely printed with igus energy chain system in XXL 3D printer

Chainflex cables and three-dimensional e-chain ensure reliable operation even with the narrowest bending radii.

Whether creating unique store concepts, futuristic concrete stairs and modern building facades, Dutch architectural design company Aectual produces very special architectural projects with the help of its robot-driven XXL 3D printer. For reliable "lights-out" robot operation, the designers opted for highly flexible chainflex cables in a triflex R energy chain with a pneumatic retraction system. In the 7th axis, an E4/light energy guide supplies the robot with energy and data.

They are unique, modern and functional: the architectural design projects of Dutch company Aectual. The company manufactures custom-made floor coverings, features, walls, and stairs that create a special, visual experience. Using 3D printing, Aectual can realise even the most complicated concepts of designers, project developers, builders and architects. These printed works of art can be found, for example, in Amsterdam's Schiphol Airport, where 2,000 square metres of floor space with an integrated floor guidance system adorn the airport concourse. The facades and interior elements are manufactured with the printer, one of the largest of its kind in Europe and the only printer of its size that runs "lights-out" i.e., remotely without server access.

The robot can print at speeds of up to half a metre per second. Aectual's material extrusion technology is integrated directly into the robot. The raw material or granulate, which consists of bio-based or recycled material, is melted in the extruder and pushed directly into the push nozzle via a screw. The extruder uses several different sensors and driven components to control the process.

When laying the material, using analogue and digital signal cables proved to be a challenge. The many cables should be arranged as compactly and robustly as possible to maintain lights-out operation. Motion plastics specialist

igus was able to supply the right cable protection system with its energy chains and cables.

Safe cable routing on the robot thanks to retraction system

"With the help of chainflex robot cables, we were able to make our system cleaner, more reliable and more efficient," explains Hedwig Heinsman, Co-Founder & Chief Commercial Officer at Aectual. "Since all cables have the same connectors, they can be easily replaced when they need to be changed. The design of the easy line replacement also gives us the opportunity to equip our extruder with other digital manufacturing tools in the future."

All cables are guided safely by a triflex R energy chain, which is specially developed for three-dimensional applications on robots. It ensures there are no line twists or fails. Aectual relies on a pneumatic retraction system (RSP) to retract the cables on the robot head. "In this way, we guarantee safe guidance of the cables and hoses even with large arm diameters and very complex movements," says Justin Leonard, e-chains director at igus UK. "The retraction forces are infinitely adjustable to the individual application by using a pneumatic cylinder."

As well as the six axes of the robot, Aectual also relies on igus motion plastics products for supplying power to the robot's 7th axis, where the developers use an E4/light energy chain to move the cables safely. The chain is characterized by its low weight, large interior space and a cost-effective price.

Erin Kemal

Tel: 01604 677240

Email: ekemal@igus.co.uk

Hannah Durrant

Tel: 01604 677240

Email: hdurrant@igus.co.uk



Image PM4021-1

Caption:

A triflex R energy chain filled with chainflex cables ensures fail-safe operation of the XXL 3D printer. The triflex RSP retraction system always keeps the energy chain at the right length. The cables in the 7th axis are guided by an E4/light energy chain. (Source: Aectual)



Picture PM4021-2

Aectual's print shop produces unique products for interior design and architecture, such as B room dividers and façade panels, protective and façade systems. (Source: Ossip)

The terms "igus", "Apiro", "chainflex", "CFRIP", "conprotect", "CTD", "drygear", "drylin", "dry-tech", "dryspin", "easy chain", "e-chain", "e-chain systems", "e-ketten", "e-kettensysteme", "e-skin", "e-spool", "flizz", "ibow", "igear", "igidur", "igubal", "kineKIT", "manus", "motion plastics", "pikchain", "plastics for longer life", "readychain", "readycable", "ReBeL", "speedigus", "triflex", "robolink" and "xiros" are legally protected trademarks in the Federal Republic of Germany and leased if necessary, also internationally.