Press release

Next Level Additive Manufacturing: Innovation in porosity

toolcraft and Siemens bring porous structures to industrial practice.

Georgensgmünd (Germany), 12 September 2024: toolcraft has been successful in the field of additive manufacturing for many years. Continuous innovation and long-term partnerships play an important role in that success. As part of working with Siemens, porous metallic structures have become an increasingly important topic for toolcraft.

toolcraft and Siemens as strategic partners for industrial manufacturing

For a number of years now, Siemens has been working on developing functionally optimised porous material structures with additive manufacturing to deliver innovative solutions across a range of industries. Similar to how a sugar cube can absorb liquid, porous metallic structures can also transport liquid using only capillary forces. Siemens researchers have successfully integrated functions, such as heat transport and cooling, directly into components using additively manufactured porous structures. Creating the first demonstrators for chemical reaction technology as part of the 3D-PROCESS project, funded by the Federal Ministry of Economics and Technology, has demonstrated the huge potential of porous material structures. 'We see potential applications particularly in the process industry, in energy process engineering and in aerospace. But applications in mechanical engineering and medical technology are also possible', explains Dr Karsten Heuser, Vice President Additive Manufacturing at Siemens Digital Industries, and continues: 'With toolcraft, we have a long-standing partner at our side to now build the strategic bridge to industrial production of these sophisticated material structures. We are delighted that toolcraft can take on this role.' The medium-sized company now wants to ensure that the structures can be applied to all plant systems in compliance with all industry standards for the process industry and intends to develop structures further into the future as part of a technology transfer. From simulation to realisation, this makes toolcraft an active pioneer for applications in industrial practice through to series production. The family-owned company is not just a qualified component supplier for the pharmaceutical industry but has also been certified as a manufacturer of additive materials under the European Pressure Equipment Directive 2014/68/EU for the material Hastelloy® C22 for more than a year. 'We see enormous potential for the industry in the production of porous structures', says Christoph Hauck, Chief Technology and Sales Officer at toolcraft AG. 'In future, we cannot only envisage additively manufactured components with this technology. AMbitious will offer training courses on the topic in the future so that we can pass on our expertise', he adds.

What porous structures can do

Hardly any other technology has produced so many innovations in the recent past as additive manufacturing – whether new materials, processes or manufacturing methods. Precise porous metal parts, for example, can be produced using the powder bed fusion process (L-PBF), where the pore size and distribution can be controlled precisely. The aim is to optimise the structural and functional requirements of components that are often difficult to achieve using conventional manufacturing methods. Permeable, yet metallically stable structures, for example, can equalise excess pressure, control temperatures more effectively and absorb liquids. Porous properties are also helpful when it

comes to guiding objects along metal. Using supplied air, objects can float on an air film along a low-friction sliding surface without wearing down the surfaces.

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About toolcraft
The medium-sized family-owned company, located in Georgensgmünd and Spalt, was founded by Bernd Krebs in 1989. toolcraft is a pioneer of forward-looking technologies, such as additive manufacturing and the construction of customised turn-key robotic solutions. As a provider of comprehensive solutions, toolcraft covers the entire process chain, from the initial idea to manufacturing, quality assurance and testing in the areas of CNC machining, additive manufacturing, injection moulding and mould making. Its clients include market leaders in the semiconductors, aerospace, medical technology, optical, special machinery manufacturing, motor sports and automotive industries. Building close working relationships with collaborative partners as well as universities, other institutions of higher education and research centres is an important part of its corporate philosophy.