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Design for Additive Manufactured Grippers

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Author Note: Steve Rommel is working as a group manager in the field of additive manufacturing at Fraunhofer IPA, Stuttgart, Germany. Here the concentration of work is on applying the new technologies to indsurtial and consumer products and to further develop the technology for industrial use. Thanks go to Fraunhofer IPA as well as Ralf Becker (Schunk) for the support.

Abstract: Additive manufacturing gives designers and engineers a geometric design space for the product development that is almost without limits. More complex shapes can not only be thought off and designed but also manufactured. Back-cuts, joints or flexible areas can be manufactured at once, thus presenting the opportunity to reduce the amount of products to be assembled as well as assembly time. With the new manufacturing processes we can move faster and more direct towards solutions for technical problems initially being difficult to manufacture or requiring complex assemblies. This includes not only complex outer shapes but also functional inner structures which can be integrated into the challenging lightweight products of the future. The Fraunhofer institute IPA is concentrating on the research and systematic development of possibilities that will arise by these new manufacturing processes introduced as processes in industrial scale and quality. One of the main goals of these efforts is to find and define solutions and functions with the possibility to be integrated directly in products. Achieving this goal will also increase the value of the manufactured products.This paper is presenting examples and alternative solution for various industrial gripper types currently on the market. The examples were developed with additive manufacturing in mind. The applicable functions of the traditional grippers were investigated in order to find alternative designs and layouts to produce a gripper fulfilling the same purpose but being manufactured in one step and consisting of one piece. This is only possible using additive manufacturing. Some of these examples are already saleable products being offered by the partners to the industry illustrating the viability of additive manufacturing as being a growing alternative to conventional manufacturing methods.

Keywords: Grippers, Design, Additive Manufacturing