Silicone 3D Printer Pump

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3D printing technology provides several opportunities for transforming the manufacturing sector. 3D printers have broadened manufacturing firms' capabilities to include the application of rapid prototyping. These new technologies encompass 3D printing pumps, and one of the latest innovations in additive manufacturing relates to the use of silicone as a material for 3D printing. Silicone is considered the best-suited for manufacturing 3D printer pumps due to its advantages, including its ability to endure heat and stress, as well as its high elasticity.

Traditionally, injection molding has been the most preferred approach to designing and producing silicone parts because of the material's high pliability, which makes it challenging to form using other methods. However, injection molding is an expensive technique, especially when used for small-scale production, due to the high costs associated with molds (Goulding, 2017). As such, injection molding is not suitable for designing and developing 3D silicone printer pump prototypes. The primary reason why silicone is considered most appropriate as a 3D printer pump material is its ability to withstand heat (Jönsson, Toppi, & Dufva, 2020). The new design approach created by WACKER, a leading chemical firm, has made it possible to conceptualize and develop silicone-based 3D printer components without making any thermal adjustments. The technique is founded on a "Drop-on-Demand" concept and is different from the Material Jetting procedure (Goulding, 2017). Fundamentally, the solitary silicone voxels are dropped by the print head onto the established platform.

The process of designing a 3D silicone printer pump follows the same procedure as the one used for developing an inkjet printer pump. The computerized machine and the working area are positioned within a glass case. Small droplets are quickly extruded, step-by-step, from the printer spouts onto the printing surface until a clear streak is developed (Ranjana, 2020). A computer is used to provide the correct coordinates in order to create the required shape and size for a 3D silicone printer pump. The area is then subjected to UV Light, which makes the silicone material vulcanize immediately (Goulding, 2017). The process is repeated until the desired pump size and shape is formed. Silicone does not return to its original liquid state once it solidifies (Goulding, 2017). Therefore, the final 3D silicone printer pump produced resembles the traditionally designed, heat resistant silicone parts (Joswig, Vellekoop & Lucklum, 2019). This approach to designing a 3D silicone printer pump is considered the most efficient because of the accuracy with which the robot delivers the droplets to develop an extremely fine printer pump, characterized by the desired shape and size.

Silicone is considered the best-suited material for manufacturing 3D printer pumps because of its ability to endure heat and stress, in addition to its high elasticity. The new design technique created by WACKER has made it possible to conceptualize and produce silicone-based 3D printer pumps without making any thermal adjustments. The process of designing 3D silicone printer pumps follows the same procedure for developing an inkjet printer pump. This approach to creating a 3D silicone printer pump is considered the most efficient because of the accuracy involved.

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