

BETTER 3D PRINTED PARTS START WITH HEATED BEDS

Application

Additive manufacturing is a process where material is layered upward on a bed to create a 3D model. Manufacturers use 3D printed parts to create prototypes during new product development or in production. Examples of 3D printed parts include complex interlocking assemblies of miniature parts, prosthetic devices, dental molds, and mandrels for irregularly shaped ceramic castings. Precision working parts can be created from a variety of materials including metal powders, thermoplastics, and thermoset polymers. Using the fused deposition modeling (FDM) process, filament polymers are melted, and deposited layer by layer through a hot-end extruder. The same filament can be processed using the selective laser sintering (SLS) where the melted material is smooth when it is deposited on the bed. Some 3D printers process in both methods and include heated beds for better results.

There are four reasons why heating the printer bed are important for producing high quality parts.

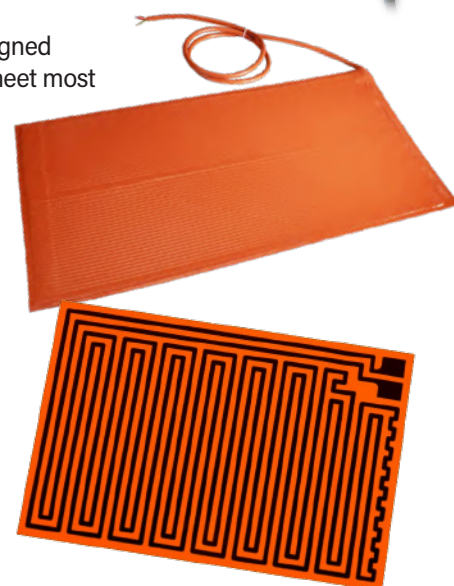
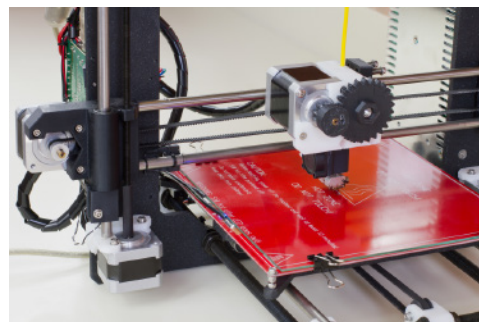
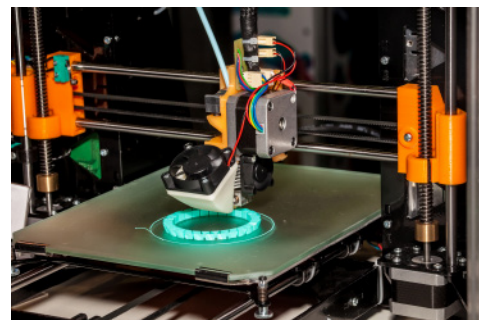
1. Prevents warping of parts – Once resins exit the nozzle and are deposited on the bed, they start to solidify. If the material cools too quickly, it will start to warp causing poor quality parts.
2. More uniform temperatures in the printing area – Uneven temperatures may diminish the strength of the part as warm material is deposited on cold material.
3. Improved adhesion of the first layer – Hot resins are sticky, making them more likely to adhere to a warm plate than a cool one.
4. Easier parts removal – Parts printed on a heated bed will contract as they cool making it easier to remove from the printer bed.

Older or less expensive 3D printers do not include heated printer beds, and can be added. In other cases, the heaters on the beds have failed or do not reach the required temperature.

Solution

BriskHeat offers silicone rubber resistance wire and polyimide etched foil heaters to improve the performance of 3D printers. When replacing a failed heater, dimensions and heating requirements of the original heater should be replicated to obtain an exact replacement. SRW silicone rubber heaters are available in power densities from 1 watt/in² to 5 watts/in², with operating voltages from 12 to 480 AC or DC. They are durable, moisture resistant and can be grounded for safety. BriskHeat etched foil polyimide film heaters are ultra-thin, and have excellent temperature uniformity and thermal response. They can be designed with power densities up to 50 watts/in². Additionally, custom heaters can be constructed to meet most OEM requirements. This includes shapes and sizes, the location of lead wires, built-in temperature sensors, holes/cutouts, and pressure-sensitive adhesive (PSA) to mount the heater in the correct location.

Adding a heater to an existing print bed can be easily accomplished but must also include other accessories. In addition to the heater and temperature sensor, a temperature controller is required. A fixed temperature thermostat can be integrated into the blanket. BriskHeat offers a complete selection of ON/OFF or PID controllers including low-cost analog models such as the TSO, or the digital TTD. For safety, a high-limit cutoff switch may be integrated into the heater or an HL101 High-Limit Controller.



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