

Accessible Tactile Graphic Printer-----Heat bed

Application Note

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3/27/2014

Reasons for using a heat bed

Why we cannot print our product on a regular surface instead of on a heated bed? Heat beds can improve the print quality tremendously because they can keep the extruded plastic warm and preventing warping. Warping is a physical phenomenon that the cooling rate of the surface and the inside part of the plastic stuff is different, in result it will cause deform of our product. The key point to prevent warping effects is to keep the material at or above the heat-defection temperature, which is the temperature the material is malleable.

The following pictures show how the products look like when printing without a heated bed:



Figure 1

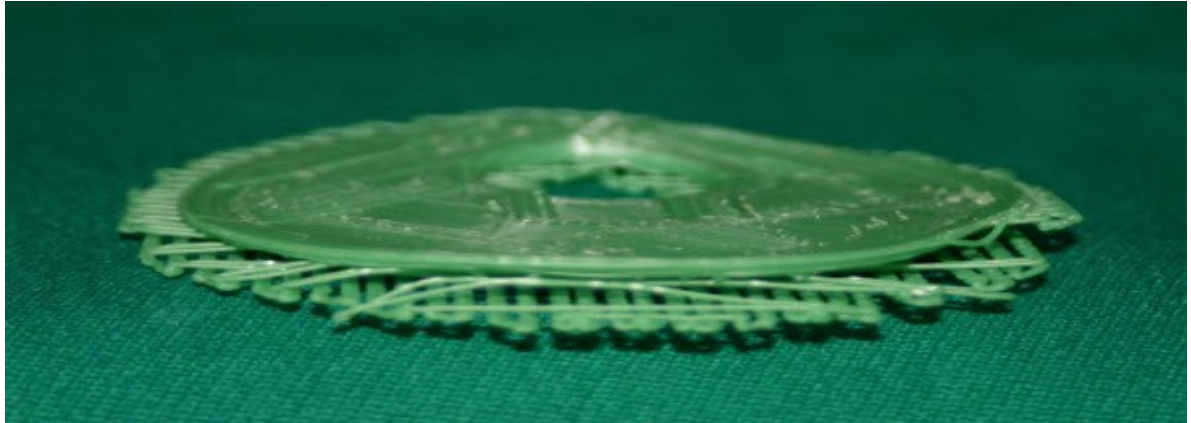


Figure 2

Types of heat bed

PCB heat bed

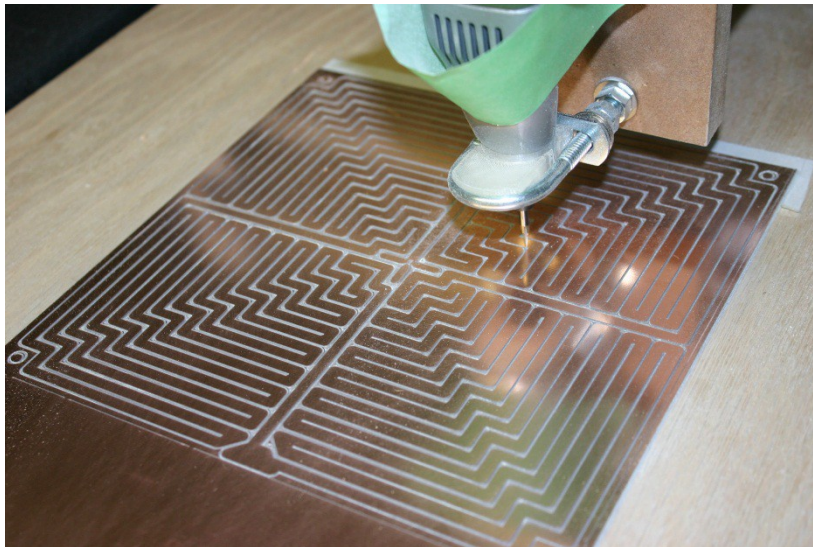


Figure 3

This type of heat bed is simple and clean, they require very little vertical clearance compared to a stainless steel sheet mounted with aluminum clad resistors and provide same heat distribution. The dark side is that it is slow to warm up, especially when using another surface such as glass.

Aluminum clad heaters

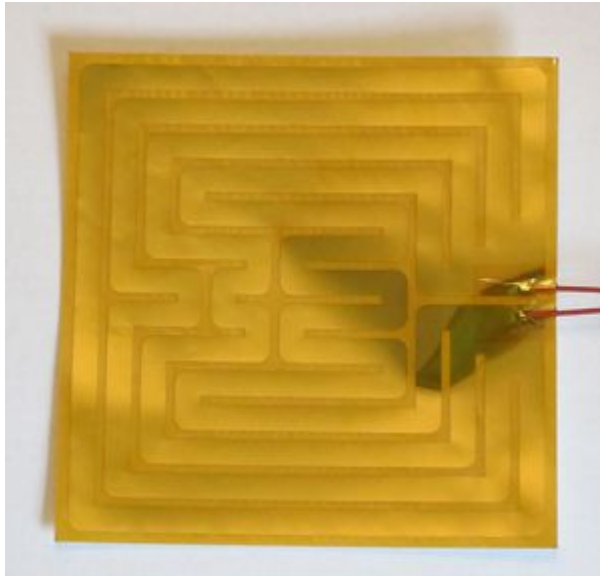


Figure 4

This type is efficient and not expensive, but it requires more time for the installation steps. Usually they need to be equipped on a stainless steel or aluminum plate. It also needs to use thermal pastes between the clad heater and the surface. The best surface to use is borosilicate glass.

Kapton (Polyamide) film heater

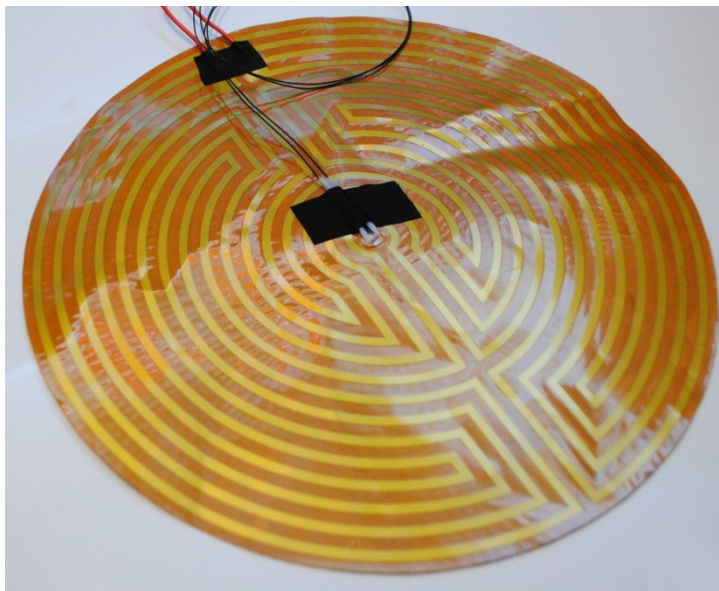


Figure 5

This type of heat bed has been widely used, since this type of heater has high adhesion for PLA, it also has good heat resistance and smooth finish. We did not think

of this type of heat bed because the filament we have chosen is ABS.

Electric Griddle



Figure 6

This is the advice we have got from the Lansing Makers Network. Since we went with the Shapeoko style design, the build surface will not move. An electric griddles are just big aluminum blocks with a heater and thermostat, and most importantly, they have their own 110V power plug.

Conclusion

Among those different types of heat bed, our team chooses the last one. One reason is that the electric griddle has its own power supply to avoid sharing power with the motors. Another reason is since our work space is big (11 inch x 17 inch), it has a large working area which the griddle will fit the size.

References

Web source

<http://bootsindustries.com/portfolio-item/heat-bed-3d-printing/#>

<http://www.stratasys.com/applications/finishing/painting>

<http://docs.shapeoko.com/workarea.html>