

Routine Maintenance

Replacing platform surfaces

There are any number of things that people apply to the print bed to aid adhesion; painter's tape, masking tape, Kapton tape, hairspray, glue-stick, ABS/acetone slurry, specialized materials such as BuildTak, etc... All of the commonly used methods will work to one degree or another. All of the commonly used methods have their drawbacks; some are messy (hairspray, glue-stick, slurry), some are more expensive (Kapton, BuildTak), and some are less suited for some materials than others (painter's tape).

For printing with PLA, painter's tape seems to be a good choice for covering the print bed. To apply the tape just, first clean the print-bed with isopropanol or another solvent. Cut strips of tape slightly longer than the longest side of the print bed. Beginning at the back of the print bed, apply the strips of tape parallel to the long side of the bed. Take care to butt the strips of tape up against one another as overlaps or gaps could cause problems.

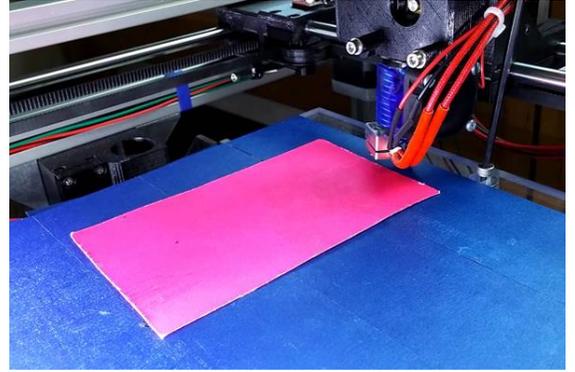
For printing with ABS, Kapton tape works quite well. Kapton tape has the drawbacks of being more expensive than painter's tape and less easy to apply. For the best outcome use Kapton tape that is wide enough to cover the print bed with one sheet. To apply Kapton, first clean the bed. While Kapton can be applied dry spraying a little bit of Windex on the print bed allows the sheet of tape to slide around a little bit before it adheres. Carefully lay the sheet of tape on the print bed taking care not to stick the tape to itself. Using a squeegee begin at the center of the tape and push the air bubbles to the edges. After the bubbles are squeezed out turn the heater for the print bed on. The heat will cause the last of the remaining Windex to evaporate. Some bubbles will appear under the tape at this time. Don't worry, most of the remaining bubbles can be pushed to the edges and the remaining smaller bubbles will go away after the bed has been allowed to heat for a while.



Leveling the Print Bed

Use a piece of unused un-rippled printer paper as a feeler gauge. Cut the paper in to a 2-3" wide strip. Preheat the printer to operating temperature. When looking at the printer, turning the leveling wheels to the viewer's right lowers the bed and turning to the left raises the bed. Turn the wheels to the right three or four times

(not complete rotations, just back them off a bit). Begin the printer's leveling routine. During the routine slide the paper strip between the extruder tips and the print bed and begin turning the leveling wheels to the left a little at a time until the extruder tip grabs the paper. When sliding the paper around to test the resistance be sure to not be touching the adjustment wheel as it will affect the height of the print-bed. After the extruder tip grabs the paper slightly begin to turn the wheel to the right a very little at a time until moving the paper gives just the slightest bit of resistance. Repeat the process at every point that the extruder moves to as part of the leveling routine, each time adjusting to the same amount of resistance. When the extruder moves to the final position in the center, resistance to movement should be greater than what was felt when adjusting the leveling wheels earlier. I will usually evenly turn all of the wheels just a smidgen or two to the right. Leveling the print bed well involves a great deal of 'feel' that can only be acquired through experience. If, when running the first print after leveling, you can hear or feel the extruder rubbing on the previous layer of plastic pause the print and once again turn the wheels evenly a smidgen to the right. If you get it right, voila, great prints, if not, the extruder will be too high and the layers of plastic won't adhere correctly to one another or it will be too low and the extruder will hit the model and knock it over.



Clearing a Clogged Extruder

For any number of reasons an extruder can become clogged. If the extruder tip can be removed, remove it and soak in acetone. Poke out any remaining ABS from the extruder opening with a solid (not wound) guitar string, feeding the string through the opening in the direction of the flow. If the extruder tip can't be removed (i.e. MakerBot) heat the extruder to near operating temperature, then stop the heating and disassemble the extruder. Be careful, the pieces are extremely hot. With the fan, cooling fins, and filament feeder removed use the long leg of a 1.5mm Allen key to force the offending plastic out through the extruder tip. Reassemble the extruder assembly and load some filament. The clog should be gone and the new filament going through the extruder should clean the rest of the gunk out of the extruder tip. If you want to do a really complete job of the cleaning; unload the filament, let the extruder cool completely, disassemble the extruder assembly and clean any remaining gunk with a pipe cleaner dipped in acetone, taking care not to mar the brass extruder tip with the steel wire in the center of the pipe cleaner.



Filament Storage

When left exposed to ambient humidity all filaments, to one extent or another, begin to absorb water. When the filament is fed in to the extruder and quickly heated, the water that was absorbed by the filament boils leaving bubbles in what has recently been extruded. If there is fairly little water in the filament the print may end up with some imperfections in the surface. If there is a lot of water in the filament the print will simply fall apart, or in extreme cases clog the extruder. Materials such as PVA or Nylon filaments are extremely hygroscopic, PLA and ABS are less so but will still absorb enough water to make them unusable if left in humid conditions. It is best to allow filament to remain in its sealed packaging until ready for use. After being used in the printer, filament should be unloaded and the rolls stored in an airtight container along with desiccant.

