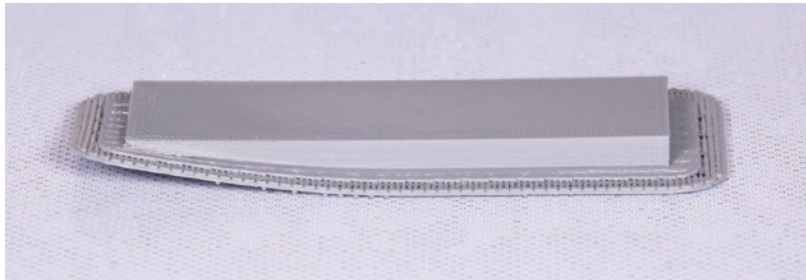


How to print very large things in ABS

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If you're reading this document, chances are high that you've tried to perform a large print on the **Zortrax** printers, and failed terribly. Don't be ashamed, this is very common and can be fairly tricky to get right the first time. But if you follow this short guide, you should be on a much better way of finishing your part!

The main problem that can arise when 3D-printing fairly large objects, is the affect of warping. When the plastic cools down from the roughly 240 °C in the nozzle, to room temperature in the printer, it shrinks. This shrinkage can be so powerful that it causes the print to lift from the platform, essentially ruining it.



TYPICAL WARPING OF A 3D-PRINT CAUSED BY SHRINKAGE

So now you might ask:

- How can I fix this shrinkage to keep my parts from warping?

The short answer is, you can't.

However, you can make your part less susceptible to warping by following some guidelines.

- **Clean the platform with a paper towel soaked in some Acetone**

If you want your part to not look like the one in the image above, and lets face it, who does? Then a great way to start is to improve the bed adhesion, and cleaning the platform will have the greatest impact of all in improving that.

To clean the platform, all you need is a paper towel and some acetone.

Remove the platform from the printer. Clean the platform thoroughly by first soaking the paper towel and then rubbing the platform.



When the platform is cleaned, put it back in the machine and commence printing.

● Use low density infill and a larger layer height

Reducing the amount of plastic will reduce the shrinkage force on the print. This can be done by either reducing the infill percentage or by reducing the wall thickness (usually reducing the infill thickness is enough). 10 % to 20 % is a good start for a low percentage. Sometimes even 0 % infill (mesh) can work.

If reducing the infill percentage will reduce the shrinkage force, increasing the layer height will increase the strength of the part, making it shrink less. A good large layer height is 0.19 or 0.29. You will get a stronger part at the cost of detail.

● Calibrate the platform

The platform being level is a crucial process of getting a good first layer. A poorly calibrated platform can result in terrible warping.

To run the semi-automatic platform calibration. Go to: "Maintenance" -> "Autocalibration" and follow the on-screen instructions.

● Consider other materials

All-tough ABS is a great material providing beautiful and rigid parts, it also has a lot of shrinkage. This might be a reason to use another material.

HIPS is another great material. It provides an amazing matte surface finish with very little shrinkage, compared to ABS. However, it is not as strong or rigid. So if strength is of a major concern than this might not be an option.

Z-ULTRAT is another great material. Very similar to ABS, it provides a bit stronger part with slightly less warping. However, HIPS is still better in the warping aspect.

PETG is a totally different material providing basically no shrinkage, therefore no warping. It is also quite soft, providing almost indestructible parts, at the cost of not being as rigid as ABS. However, PETG can be challenging to print due to its lower temperature profile and print speed.

● Using adhesive

If you've tried all the above steps and your print is still warping. Then it might be a good idea to apply some sort of platform adhesion. This will cause the print to bond even better to the bed preventing warping even further. There are two types of adhesive we like to use.

Magigoo is a commercial print adhesive that is designed for this very purpose and makes prints stick very well to the platform. It also has the benefit of making your prints easier to remove, since the adhesive softens when it cools down.

ABS-juice Is a home-made type adhesive that consists of Acetone and ABS. It has the absolute best adhesion properties. The problem being is that prints are very difficult to remove. Even after the platform has cooled down. In addition, the bed can be difficult to clean afterwards.

If you're still having difficulties with your print, consider consulting your mentor for additional tips and tricks. Also, the Zortrax support center is a great place to find tutorials and guides for 3D printing:

<https://support.zortrax.com>

Good luck, and happy printing