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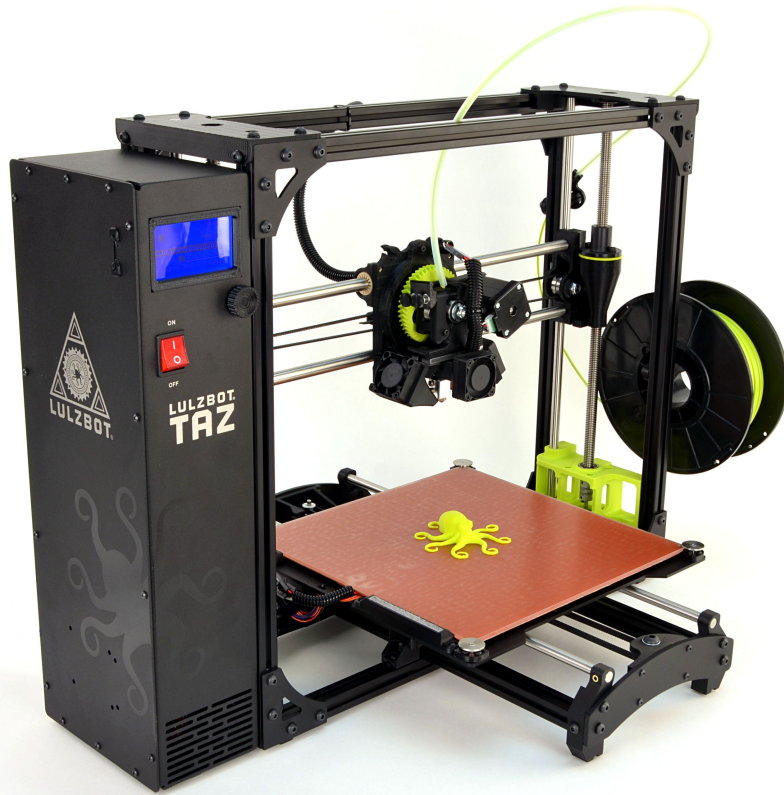
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# LULZBOT TAZ 6 USER MANUAL



Aleph Objects, Inc.

**LulzBot® TAZ 6 User Manual**

**by Aleph Objects, Inc.**

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**Published by Aleph Objects, Inc., 626 West 66th Street, Loveland, Colorado, 80538 USA.**

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**ISBN: 978-0-9893784-8-2**

**6.0-20160322**

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WARNINGS  
Safety Information

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WARNING!

## Read Me First!

READ THIS MANUAL COMPLETELY BEFORE UNPACKING AND POWERING UP YOUR PRINTER.

## Hazards and Warnings

Your LulzBot® TAZ 3D printer has motorized and heated parts. Always be aware of possible hazards when the printer is operational.

### Electric Shock Hazard

Never open the electronics case when the printer is powered on. Before removing the electronics case cover, always power down the printer and completely turn off and unplug the printer. Allow the printer to discharge for at least one minute.

### Burn Hazard

Never touch the hot end nozzle or heater block without first turning off the hot end and allowing it to completely cool down. The hot end can take up to 20 minutes to completely cool. Never touch recently extruded plastic. The plastic can stick to your skin and cause burns. The print surface can reach high temperatures that are capable of causing burns.

### Fire Hazard

Never place flammable materials or liquids on or near the printer when it is powered on or operational. Liquid acetone, alcohol, or other chemicals may release vapors that are extremely flammable.

### Pinch Hazard

When the printer is operational take care to never put your fingers near any moving parts including belts, pulleys, or gears. Tie back long hair or clothing that can get caught in the moving parts of the printer.

## Age Warning

For users under the age of 18, adult supervision is recommended. Beware of choking hazards around small children.

## Modifications and Repairs Warning

At Aleph Objects, Inc. we respect your freedom to modify your LulzBot® desktop 3D printer. However any modifications or attempted repairs that cause damage are not covered under the Warranty. Questions? Contact Technical Support by emailing [support@lulzbot.com](mailto:support@lulzbot.com), or by calling +1-970-377-1111.

# Regulatory Compliance Statement Class B

## Federal Communications Commission Statement

**CAUTION: Changes or modifications not approved by the party responsible for compliance could void the users authority to operate the equipment.**

**NOTE:** This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

1. Reorient or relocate the receiving antenna.
2. Increase the separation between the equipment and receiver.
3. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
4. Consult the dealer or an experienced radio/TV technician for help.

WARNING!

### **Industry Canada Statement**

Cet appareil numérique de la classe B est conforme à la norme ICES-003 du Canada. This device complies with Canadian ICES-003 Class B.

### **Australian Communications and Media Authority Statement**

This device has been tested and found to comply with the limits for a Class B digital device, pursuant to the Australian/New Zealand standard AS/NZS CISPR 22:2009 + A1:2010.

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## 3D Printer Software

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## 1.1 Software Overview

To operate your desktop 3D printer you will need to install a few software packages onto your PC. You will need a 3D printer host, an .STL to .GCODE generator, and optional CAD or 3D modeling software.

Cura LulzBot® Edition is the recommended software for your LulzBot 3D printer. Download Cura LulzBot Edition by visiting [LulzBot.com/Cura](http://LulzBot.com/Cura).

All of the following Free/Libre Software packages are available for GNU/Linux, Windows, and OS X. We highly recommend using these programs on GNU/Linux.

## 1.2 Software Types

### Printer Hosts

Printer Host software is used to control the 3D printer. The program not only allows you to manually move the printer along all the axes, but set temperatures manually, send commands, and receive feedback/error messages from the onboard electronics. We recommend that new users start with Cura LulzBot® Edition as it includes a slicing engine as well.

### Slicers

These programs take the 3-Dimensional model (typically STL/OBJ/etc) and determine the 3D printer toolpath based on the options selected. The slicing engine uses the nozzle diameter, movement speeds, layer height, and other variables to determine the coordinates where it needs to move, and the rates at which it will do so. This information is exported out of the program as a GCODE file. The GCODE file is a plain-text file with a series of text-based codes and a list of the complete X,Y, and Z-axis coordinates used for printing the 3D model. We recommend that new users start with Cura LulzBot Edition as it includes the printer host as well.

## 1.3 Installing Drivers

GNU/Linux and OS X users will not need to install a driver to communicate with the LulzBot TAZ 3D printer. Windows users will need to install the drivers. Using Cura LulzBot Edition as your printer host and slicing software is recommended, as the drivers will automatically be installed during the Cura installation process. Download Cura LulzBot Edition by visiting [LulzBot.com/Cura](http://LulzBot.com/Cura). The drivers can also be downloaded from [LulzBot.com/downloads](http://LulzBot.com/downloads). A visual guide showing the driver installation process can be found in our download section as well.

## 1.4 CAD and 3D Modeling Software

LulzBot is not distributing a CAD or 3D modeling software package. However, multiple Free/Libre Software packages are available. Other common non-free CAD and 3D modeling software are also capable of exporting the required .STL files.

On some CAD and 3D modeling software you will need to select millimeters as the output unit. If possible it is best to build your 3D design in metric units rather than imperial units. Cura requires .STL files sized in millimeters. If an .STL with inches as units is loaded into Cura, the model will be scaled much smaller than expected. You can scale the model by 25.40 to compensate. The software listed below outputs millimeters as the unit by default.

### FreeCAD

Website: <http://www.freecadweb.org/>

Although still in development, contains a full GUI for building CAD models. FreeCAD is capable of creating simple to complex designs. STL files can also easily be exported for use with 3D printing. FreeCAD is available for GNU/Linux, Windows, and OS X. The latest development version is recommended.

### OpenSCAD

Website: <http://openscad.org>

OpenSCAD is different than FreeCAD in that it is script based. Rather than using a GUI to generate CAD designs, OpenSCAD CAD designs are created using script based renderings. Users with programming experience would find this useful. Also, OpenSCAD uses a simple script language that is easy for users with little or no programming experience to learn.

### **Blender**

Website: <http://blender.org>

The most widely used Free/Libre Software 3D modeling software, Blender is well documented with tutorials available on the Blender.org website as well as found online.

### **Shapesmith**

Website: <http://shapesmith.net>

Shapesmith is a web-based 3D modeling software. This means there is no required software to get started designing models. Shapesmith is also a great choice for anyone starting out in CAD/ 3D modeling.

## **1.5 Alternative Printer Host Software**

### **OctoPrint**

Website: <http://octoprint.org/>

Octoprint is a printer host that uses a web-based interface to access and control your 3D printer. Added web-cam functionality allows for time-lapse videos and a live stream. Octoprint will run on GNU/Linux, Windows, OS X based computers and can even run well on a Beagle Bone Black or a RaspberryPi (inexpensive business-card sized computers).

### **BotQueue**

Website: <https://www.botqueue.com/>

BotQueue works well for those users wanting to have a web-based multiple 3D printer operation running off a queuing system.

## **MatterControl**

Website: <http://www.mattercontrol.com/>

MatterControl is another printer host that currently runs on GNU/Linux, Windows, and OS X. It features 2D and 3D model viewing, a print queue, and print file organization and searching.

## **Source Files**

Aleph Objects, Inc., the maker of the LulzBot® TAZ 3D printer, completely supports Free Software, Libre Innovation, and Open Source Hardware. Along with the LulzBot TAZ 3D printer being a Free Software and Open Source Hardware design, it has been tested to work with 100% Free/Libre Software. Our source code and design files are hosted on:

LulzBot Download Server <http://download.lulzbot.com>

LulzBot Development Server <http://devel.lulzbot.com>

Aleph Objects Code Repository <http://code.alephobjects.com>

Aleph Objects Download Server <http://download.alephobjects.com>

Aleph Objects Development Server <http://devel.alephobjects.com>





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Cura LulzBot Edition

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## 2.1 Cura

### Setup Cura

Cura LulzBot Edition is available for download on our website at <http://LulzBot.com/cura>. When installing, it is recommended to uninstall any previous versions of Cura you may have been using. Cura is designed for Fused Filament Fabrication (FFF) 3D printers. Fused Filament Fabrication is the term for the process of laying down successive layers of extruded filament to create a 3 dimensional object. As each layer of molten plastic is extruded into place, it fuses with the previous layer. When first opening Cura, you will be prompted to go through the **First run wizard**. This will consist of selecting your printer, hot end type, tool head type, and finally your nozzle diameter.

**It is important to select the correct printer, hot end, tool head, and nozzle diameter as Cura uses custom profiles and machine settings based upon which printer, hot end, tool head, and nozzle you have.**

- Download the appropriate installer for your computer operating system. Instructions on installation for each operating system are available at <http://LulzBot.com/cura>.
- Install Cura by double clicking on the installer.
- Click through the install wizard until it completes.
- Start Cura by launching it from your list of installed applications. If this is the first time that Cura has been used the “Configuration Wizard” window will open.
- Select **LulzBot TAZ 6**. Press **Next**.
- Select **Single Extruder v2.1**. Press **Next**
- Select **finish**.

## 2.2 Quick Print Settings

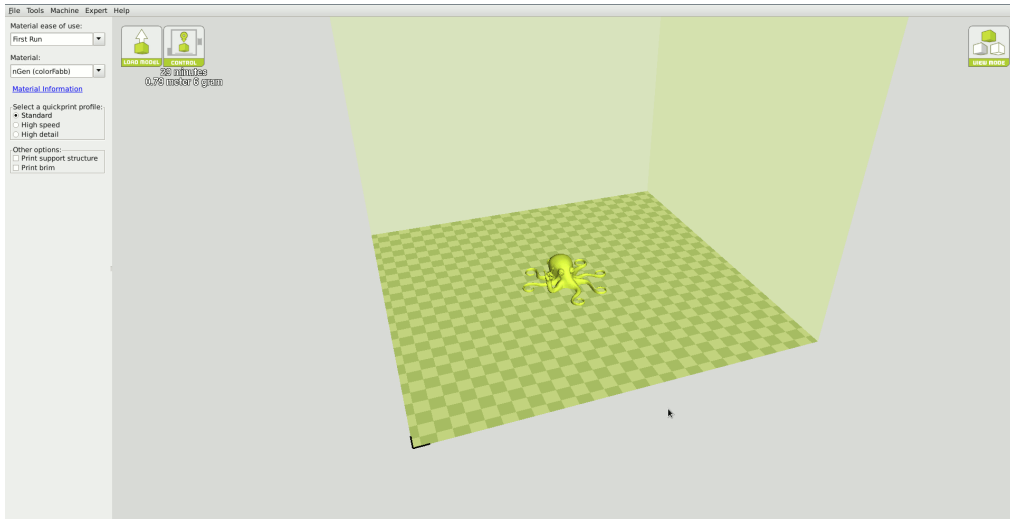


Figure 2.1: Quick Print Settings

After setting up Cura for the first time, you will be shown the main interface screen. (Fig. 2.1, page 19)

### Selecting a Quick Print Profile

The print quality settings can be found in the top left-hand corner of the window. For most filaments, there will be **Standard**, **High Speed**, and **High Detail** options. Some of the more exotic filaments may only have a single profile.

#### High Detail

Designed to give greater detail and finer objects. This will have a smaller layer height, which will make each layer thinner, so that curves seem more natural and walls seem less noticeable. This setting will also require more layers to be laid down, increasing overall print time.

#### Standard

Designed to give a balanced resolution by increasing the layer height

and print speeds. This will make the organic curves slightly more step-like than the fine setting, but it will reduce printing time.

### **High Speed**

Designed for the fast prints, where the overall model finish is not of concern. Most commonly used for quick iteration of designs when rapid prototyping.

### **Material Selection**

We have the different filaments separated by **Material ease of use**. From the **Material ease of use** drop down, select "All" to view all our pre-loaded filament slicing profiles. The TAZ ships with a filament sample for the first print. Refer to the included Quick Start Guide for the proper "First Run" settings.

### **Printing Support Material**

The LulzBot TAZ 3D printer is able to print models that have angles and overhangs, even without support material. This will depend on the overhang distance and angle of your particular model file. Turn this option on if your model could benefit from support material.

### **Brim**

Brim is used to increase surface area of the part you're printing, thereby ensuring proper part adhesion. This will print a single layer high edge around the base of the part, helping first layer adhesion and minimizing warping.

### **Load Model File**

Select the STL model you would like to print. Either use the **Load Model** button or select **File > Load Model**. Once the file has been loaded, you will see a 3D rendering of your object on the build platform. Select the model to see the various options.

## 2.2. QUICK PRINT SETTINGS

### Model Orientation

Move your model to change where it is printed on the build plate. Do this by left clicking on the model and dragging it to the desired location. The black outlined corner of the 3D print bed view represents the front left hand corner of the build plate on your printer. By holding down the right mouse button and dragging, you can view your model from different angles.

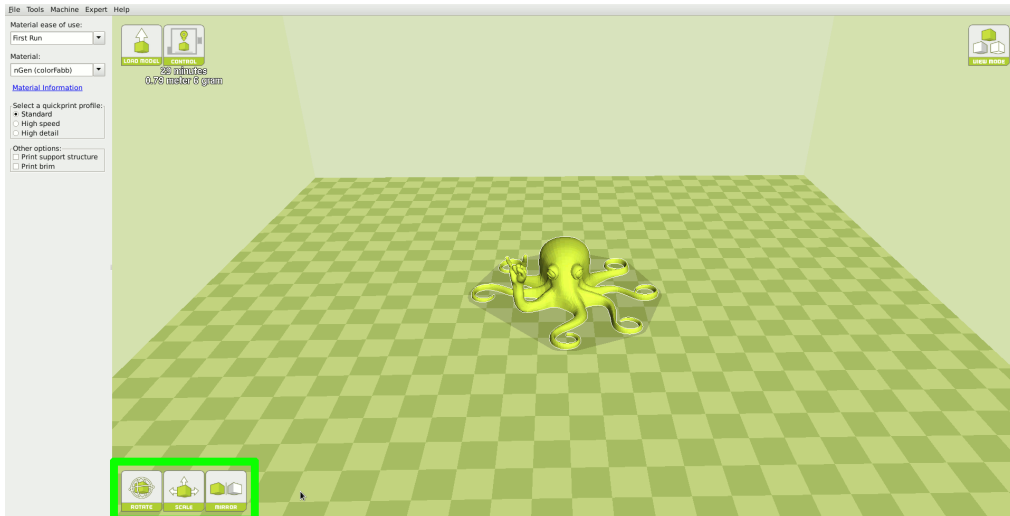


Figure 2.2: Options after selecting model

### Rotate

The Rotate button will give you the ability to orient your model in along all three axes. Once you click the rotate button, three circles will surround your model. The red circle will allow you to rotate around the Z-axis. The Yellow circle will rotate around the Y-axis. The Green circle will rotate around the X-axis. Cura defaults to 15 degree increments. Hold Shift to rotate by One Degree Increments.

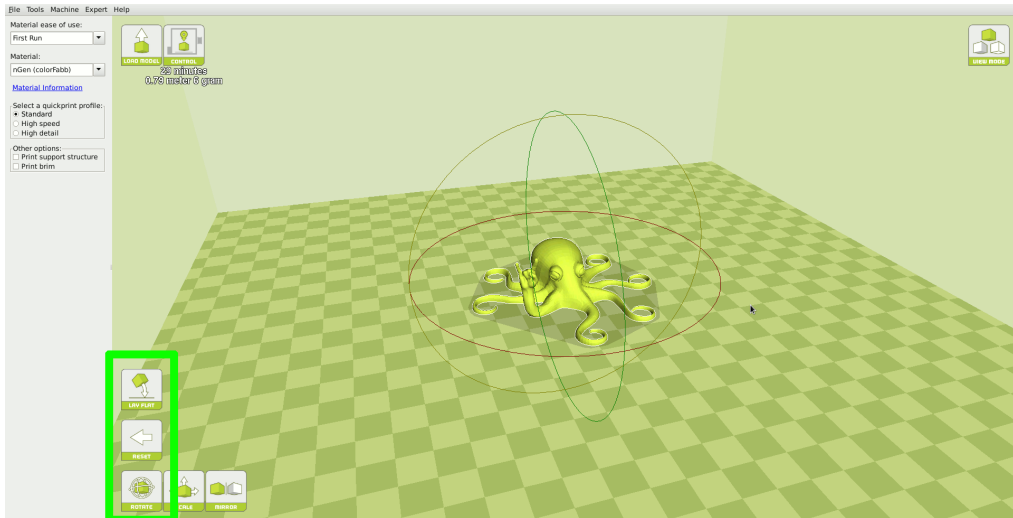


Figure 2.3: Rotating your Model

## Lay Flat

The **Lay Flat** button will ensure that the flat portion of your print is securely attached to the bed. It is highly recommended to use this option after rotating your model in the Z direction, as it will help prevent potential adhesion issues during the print.

## Reset

The **Reset** button will return your model to the original orientation as defined by the CAD program used to create the model.

## Scale

The **Scale** button displays the model dimensions, along with the ability to scale along the X Y or Z axes. Anything **below** the number 1.0 will reduce the objects size, while anything **above** the number 1.0 will increase the objects size. As a default, it will be set to uniform scaling. This will cause the X Y and Z axes to be scaled by the same amount when you make a change to any of them. To disable this, select the lock in the lower section of the scaling window.

## 2.3. VIEW OPTIONS

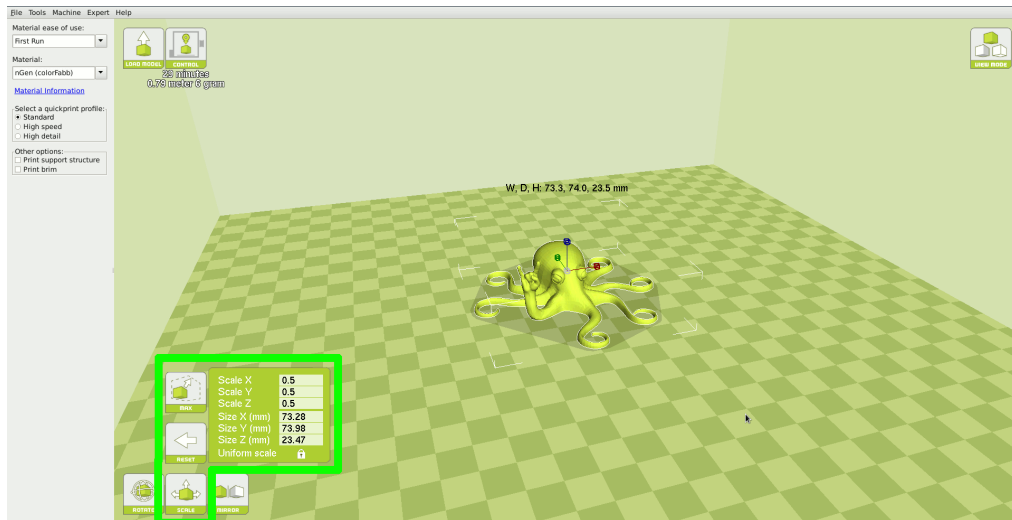


Figure 2.4: Scaling your Model

## 2.3 View Options

Different modes allow you to view your model in a variety of ways. This can be helpful for spotting issues before the print even starts.

### Normal

This is the standard view and shows the solid outer surfaces of the model. (Fig. 2.5, page 24):



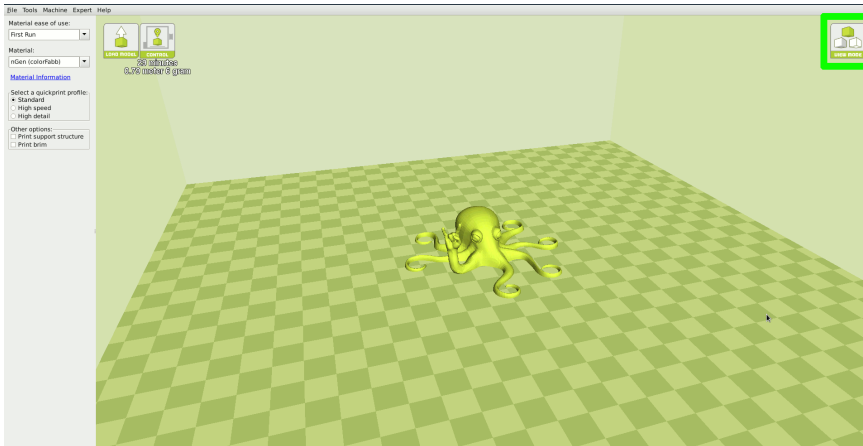


Figure 2.5: View in Normal Mode

## Overhang

Overhang mode shows where your model may need support material. In Fig. 2.6, page 24 the red highlighted areas show overhangs and more severe angles and areas where support material is recommended. The overhang threshold can be defined in Expert Settings.

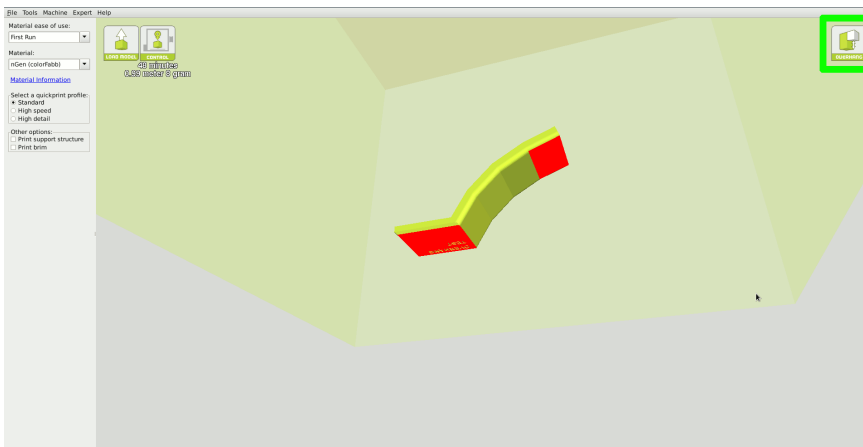


Figure 2.6: View in Overhang

## 2.3. VIEW OPTIONS

### Ghost

Ghost view mode makes the model translucent to allow you to see what is behind it.

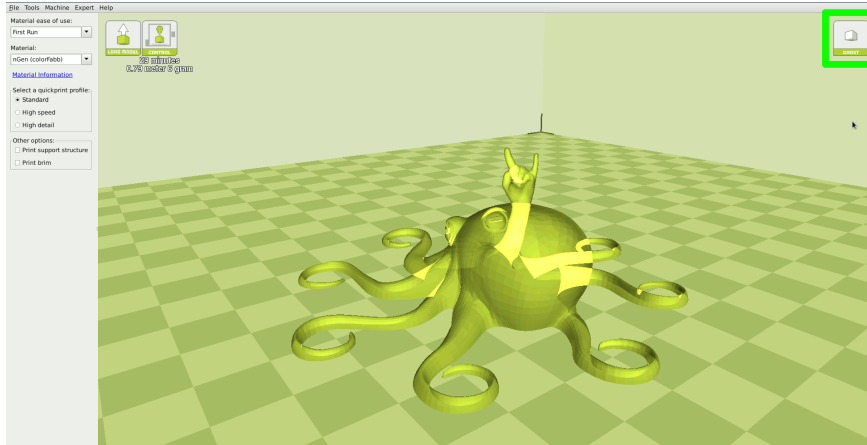


Figure 2.7: View in Ghost

### Xray

Xray is similar to Ghost mode. It will allow you to see into objects, ensuring that inner details are correct.

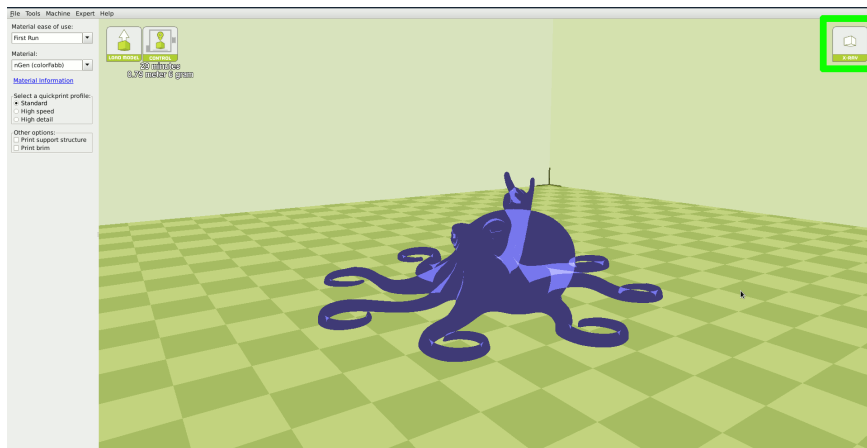


Figure 2.8: View in Xray