# Hochul Magazine

Designed by Remnants

This magazine design wouldn’t be where it is now without the great beta testers within Deterrence Dispensed.

# Description

This is the Hochul Mag, in honor of the first 3D printable magazine design, the Cuomo mag. Named after the wonderful governor of NY, Kathy Hochul, who banned 'ghost guns' in NY in 2022. This magazine is designed for an AR15 in 5.56/.223 (as well as 300 blackout and 50 beowulf) and is in part based on a gen 3 PMAG. All components are compatible with a factory gen 3 PMAG. The magazine is made up of a 10 round base component that allows for the fitment of +10, +20, +20 windowed and +30 extensions. The extensions slide onto the base component just as a base plate would slide onto a standard magazine. Either a standard base plate can be used or a ranger plate, which is looped on the bottom for easier removal from a plate carrier/chest rig. To allow for the extensions to be held in place when on the base component, two screws are screwed into the holes on the front area of the extensions to prevent them from backing out.

# Hardware Requirements

***Springs***

- For use with 10 round base component and with +10 extension – 20 round magazine springs

  Wolff 20 round extra power springs will **NOT** work due to entirely different follower connection bend. Although not sold separately, PMAG 10 and 20 round magazine springs will work. Unfortunately, there aren't many 10 round and 20 round spring options.

- For use with +20/+20 windowed extensions and +30 extensions – 30 round and extra power 30 round magazine springs

Wolff 30 round extra power springs work great for both the +20 and +30 round extensions but are out of stock a lot of the time on various websites. Extra power springs are recommended for use with the +30 extensions.

***Screws***

- 2x M3x10 Hex Socket Head Cap Screws for each of the extensions

***1/32" Thick Polycarbonate Sheet (For Windowed Extension)***

# Recommended Tools

- Wire Cutters (such as those included with the ender 3 and other creality machines)
- Needle Nose Pliers
- File
- 1200 Grit Sandpaper
- Xacto/Craft Knife
- Punch

- Gun Oil/Lubricant
- Lighter
- Scissors and Fine Point Sharpie (only for PC sheet on windowed extension)

# Recommended Slicer Settings

***For All Components***

- Material: PLA+, Filled Nylon
- Nozzle Temperature: 210C-230C (for PLA+)
- Bed Temperature: 50C-60C (for PLA+)
- Nozzle Size: 0.4mm
- Filament Size: 1.75mm
- Layer Height: 0.16mm-0.2mm
- Walls Line Count and Upper/Lower Layers: 8
- Infill: 100 percent

***For Each Particular Component:***

- **10 Round Base** – 80 percent cooling, normal support (touching buildplate for support placement), support overhang angle of 35 deg, brim, support blockers (shown in Build Plate Orientation), z-seam: smart hiding for Seam Corner Preference and sharpest corner for Z Seam Alignment (to ensure inside is smoother)
- **Follower** – 0 cooling, tree support recommended, brim
- **Base Plate Retainer** – 0 cooling, tree support recommended, brim
- **Base Plate** – 60 percent cooling, normal support (touching buildplate for support placement), support overhang angle of 20 deg, brim, z-seam: smart hiding for Seam Corner Preference and sharpest corner for Z Seam Alignment
- **Ranger Plate** –60 percent cooling, normal support, support blocker (shown in Build Plate Orientation), support overhang angle of 40 deg, brim, z-seam: smart hiding for Seam Corner Preference and sharpest corner for Z Seam Alignment
- **Dust Cover** – 40 percent cooling, normal support, support overhang angle of 40 deg, brim
- **+10 Extension** – 0 cooling for first 20mm, then 60 percent. Normal support, brim, z-seam: smart hiding for Seam Corner Preference and shortest for Z Seam Alignment (to ensure inside is smoother)
- **+20/+20 Windowed Extension** – 0 cooling for first 65mm, then 60 percent. Normal support, support blockers (shown in Build Plate Orientation), brim, z-seam: smart hiding for Seam Corner Preference and shortest for Z Seam Alignment (to ensure inside is smoother)
- **+30 Extension** – 0 cooling for first 110mm, then 60 percent. Normal support, support blockers, brim, z-seam: smart hiding for Seam Corner Preference and shortest for Z Seam Alignment (to ensure inside is smoother)
- **Window Extension Guide (to cut out PC sheet pieces) –** N/A

Another component included, along with the dust cover that is used with the Hochul Mag, is a factory PMAG dust cover. The dust cover for the Hochul Mag has extra cuts at the rear due to the feed lip reinforcements on the base component. Therefore, if used with a factory PMAG, the inside will be slightly exposed. So, for those who want a dust cover for their factory PMAG, another dust cover without cuts is included as well.

**Note:** Cooling and support settings needed are highly dependent on the printer and the cooling duct on the printer, as well as the material. An example of a change that can be made with a printer that has a very good cooling fan and fan duct setup can be with the base plate and ranger plate. The base plate can print out just fine without support and the ranger plate can print fine with tree support on a better setup. These settings listed above were found to work well with a range of PLA plus filaments on an ender 3 that has a stock cooling duct.

Another very important setting to ensure the cleanest components and easiest removal of support material is the Support X/Y Distance. The recommended distance for the 10 round base is 0.35mm, for the extensions is 1.2mm, for the base plate, ranger plate and dust cover is 0.6mm, and for everything else is 0.8mm. This support setting is shown in Cura below:

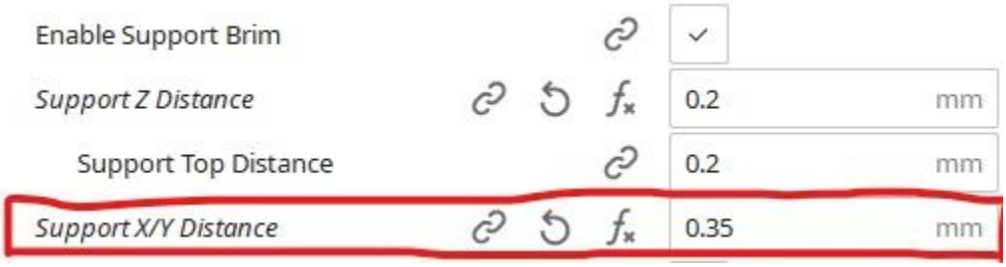


**Figure 1: Support X/Y Distance Example**

# Build Plate Orientation

***10 Round Base***

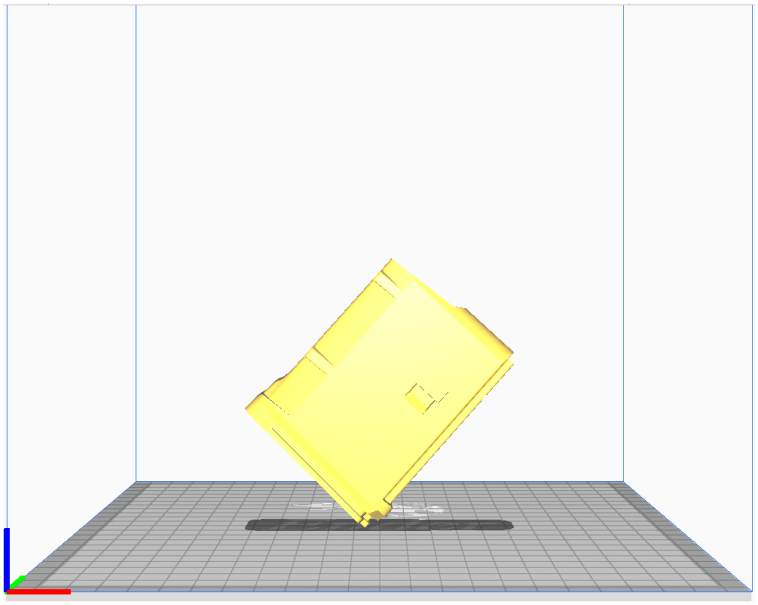

**Figure 2: 10 Round Base Orientation (45 deg)**

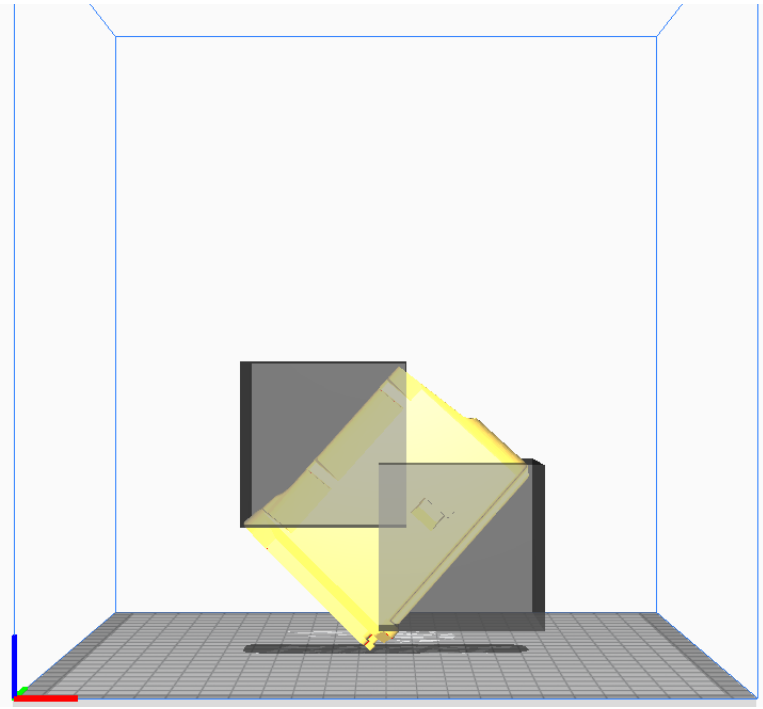

**Figure 3: 10 Round Base Support Blockers 1**

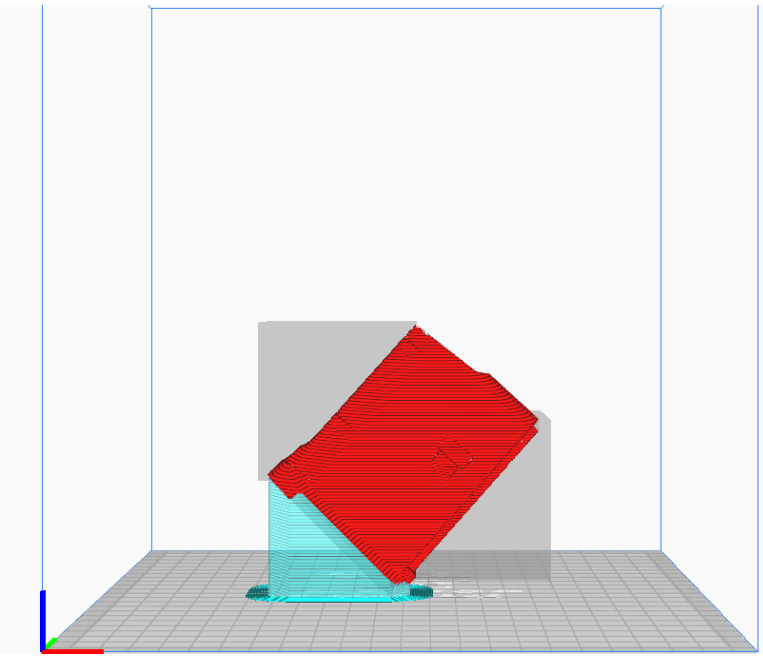

**Figure 4: 10 Round Base Support Blockers 2**

There should only be support on the outside surfaces of the magazine. Two support blockers scaled up to 600 percent are recommended.

***Follower***

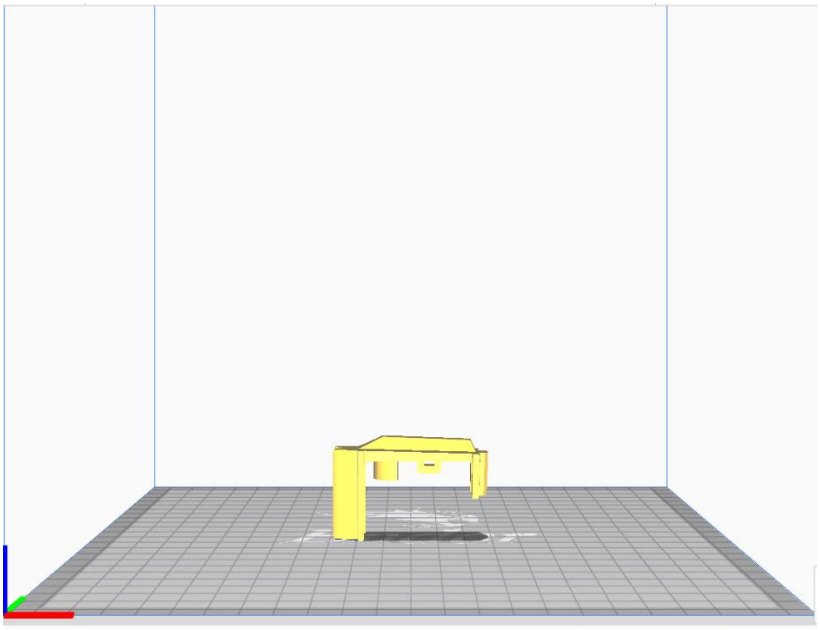

**Figure 5: Follower Orientation**

***Base Plate Retainer***

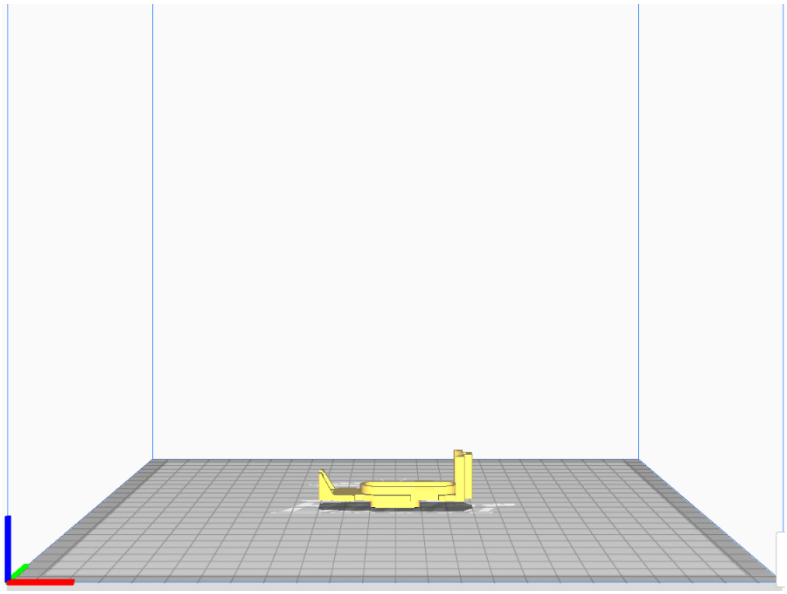

**Figure 6: Base Plate Retainer Orientation**

***Base Plate***

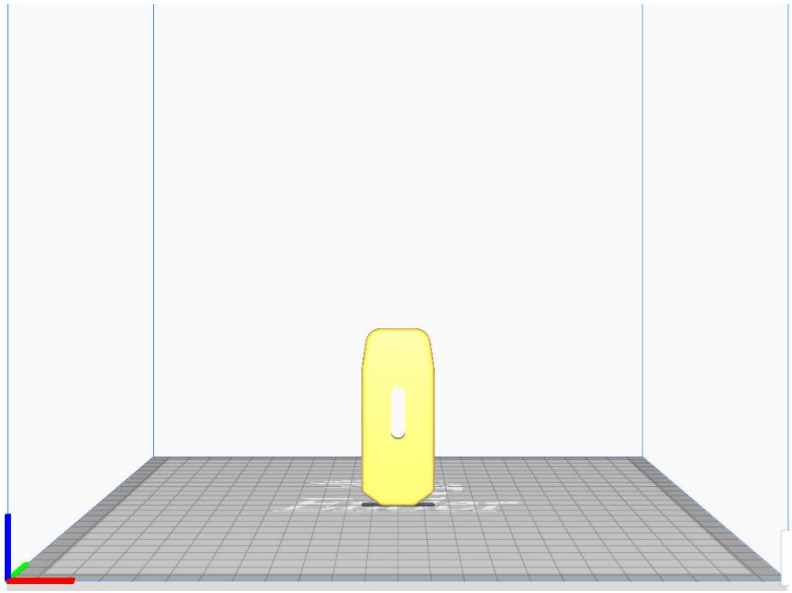

**Figure 7: Base Plate Orientation**

***Ranger Plate***

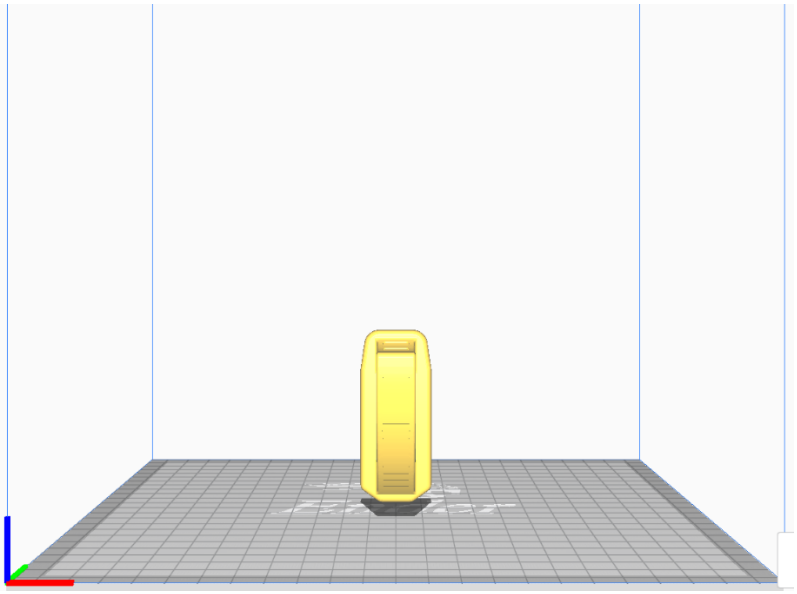

**Figure 8: Ranger Plate Orientation**

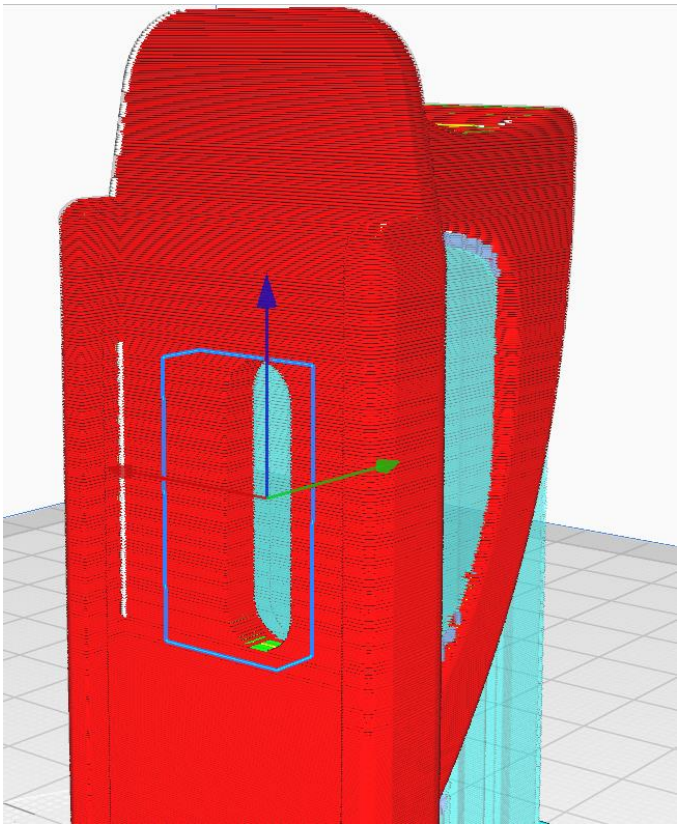

**Figure 9: Ranger Plate Support Blocker**

The support blocker is to block support material from building within the base plate retainer cutout.  A blocker scaled up in the z-axis to 200 percent works well.

***Dust Cover***

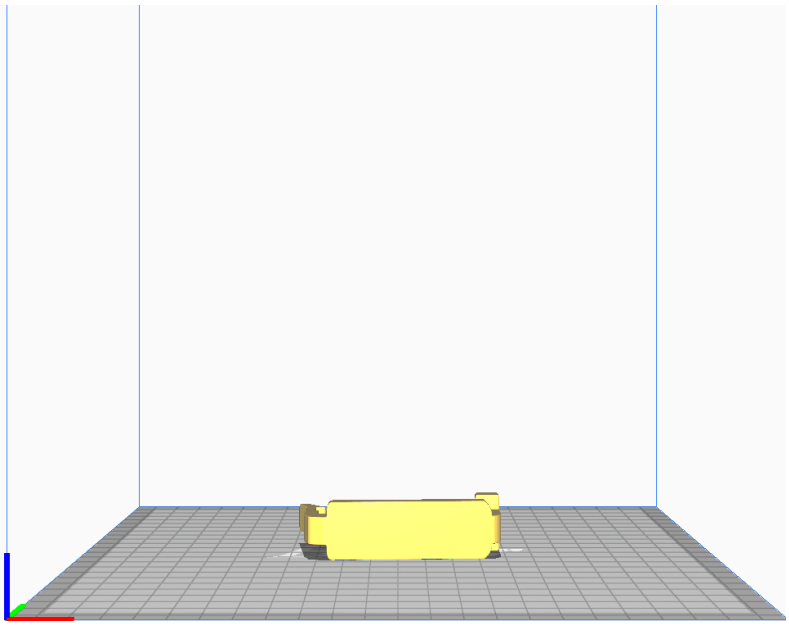

**Figure 10: Dust Cover Orientation**

***+10, +20/+20 Windowed and +30 Extensions***

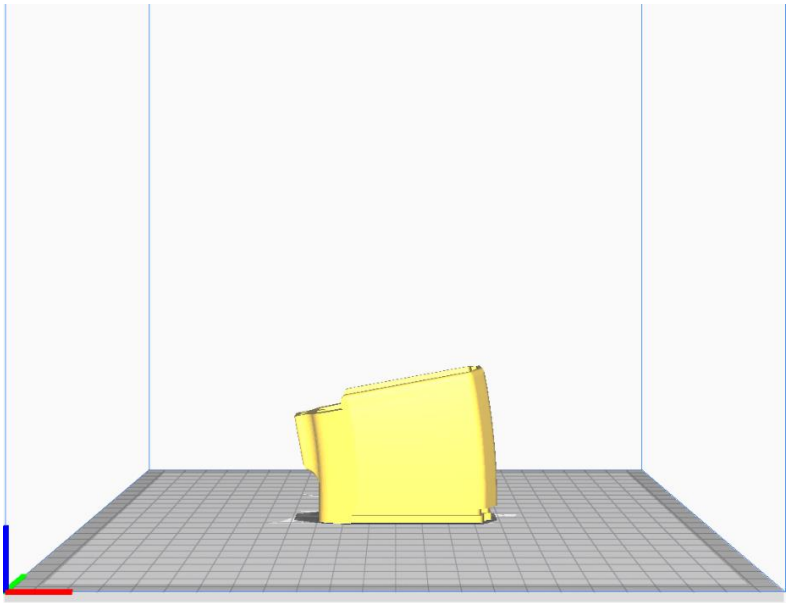

**Figure 11: Extension Orientation**

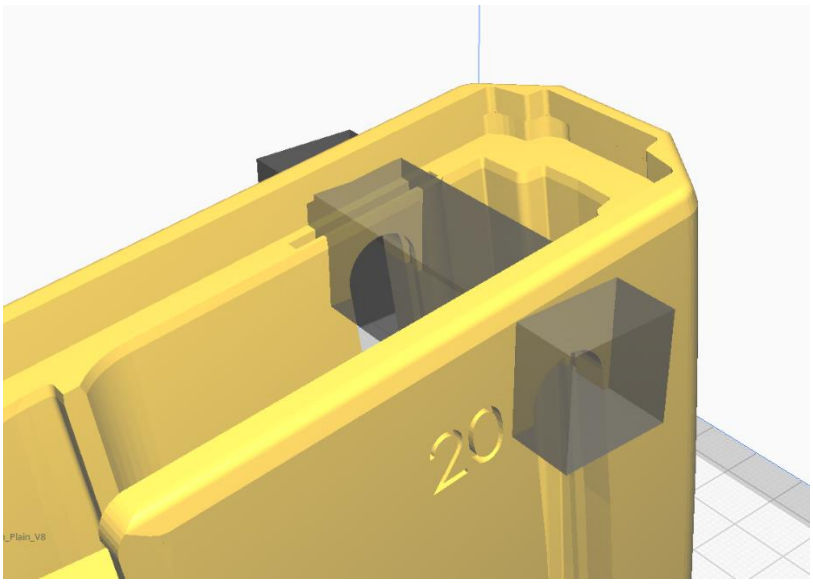


**Figure 12: Support Blocker for +20 Windowed Extension**

There should only be support going along the cutouts for the base plate on the bottom for the extensions. The windowed extension will need a support blocker towards the upper area of the side cut outs (y-axis scaled up to 400 percent works well) and the 30rd extension may need an extra support blocker on the bottom of the screw extrusion for the m3 screws (depending on support settings).

***Window Extension Guide***

Just lay the guide flat on the build plate. Outside of that, the orientation doesn't really matter, as it is just being used to cut the PC sheet to size.

# Support Removal Tips

The wire clippers and needle nose pliers can be used for most of the support removal. A thin blade like an xacto knife can also be used to help with clean up and to take support material off, but use with caution. The blade is very thin and can easily break and cause injury if not careful. The side support of the extensions should come off easily, but the rear area of the support will need to be worked slightly. The support material on the 10 round base will be a little difficult to remove, but most of it should come off in one hard pull with pliers. The rear base support may need to be worked slightly. The support material of the ranger plate within the looped cutout will be slightly difficult to remove and may need to be tapped out with a punch. This could leave some support on the main overhanging area needing support within the cutout of the ranger plate, but this can be cleaned up with an exacto knife. The support material of everything else shouldn't be very difficult to remove. A lighter can be used to clean up any stringing or whitening (flame helps to turn color back to original color printed with) on the components.

# Post Processing

Due to the rougher internal surface finish of FDM components vs injection molded components, it is recommended to put a few drops of gun oil/lubricant on a brush and rub the internals of the 10 round base, extension, as well as the front, rear and sides of the follower. This may not be necessary for operation depending on print settings, but regardless, it will make the magazine run much smoother.

All of these areas above can be cleaned up with a thin blade like an xacto knife and a file to smooth out the rough parts.

***10 Round Base***

Unfortunately, due to the low cooling fan settings of the 10 round base component, there are a few areas that may slightly sag and need to be cleaned up. This includes the areas shown below:

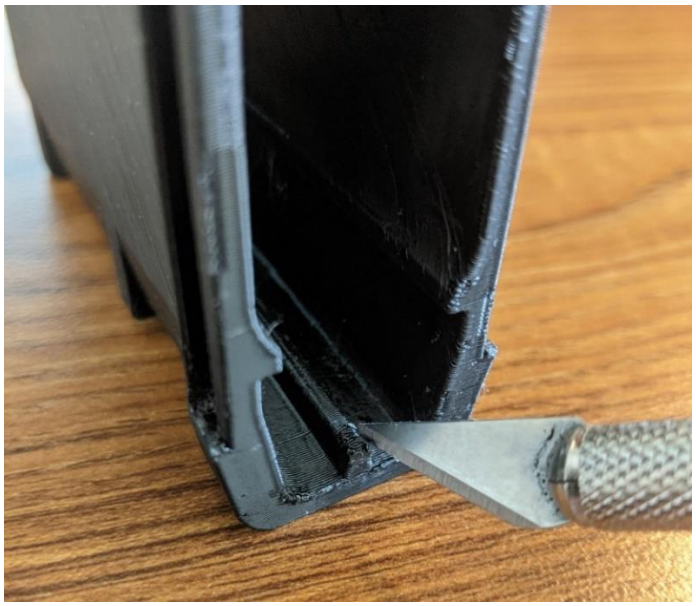

**Figure 13: Lower Area on Follower Guide**

**Figure 14: Surface Underneath Follower Stop on Upper Area**

The underside of the top of the follower stop droops and won't allow the follower to fully rise if this isn't cleaned up internally. This **WILL** give issues if not cleaned up. It is recommended to take a file from the bottom of the base and smooth out the area that is drooped. Most of it can be cleaned up simply by rubbing the file up and down on the underside.

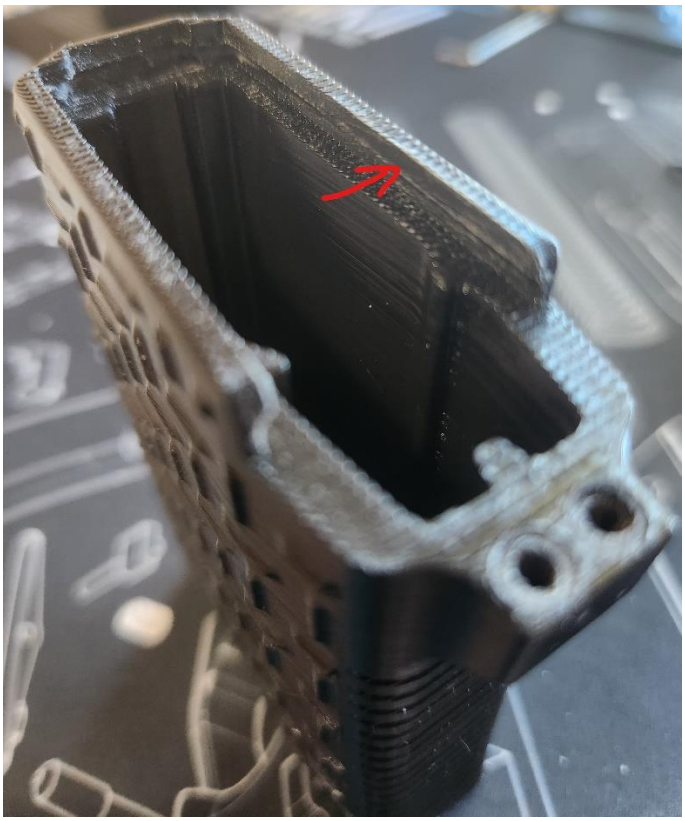

**Figure 15: Underneath Extension Connection**

The underside of the extension connections will come out slightly sagged due to the print orientation and **WILL** require a small amount of sanding with a file to make the undersides flat, for a more reliable fit with the 10 round base component. The upper portion of the connection on the extensions portion that will be sanded was purposely designed taller than it should be to compensate for the sanding required. The extensions shouldn't be very tight when going on the base component, but also shouldn't wiggle at all, so check fitment during sanding to make sure too much material isn't taken off. You will be able to tell if sanding is needed if the internal cuts are not lined up internally with the 10 round base cuts.

# Sanding to Reduce Chance of Hang Ups with Assembled Magazine

Regardless of how dialed your settings are, no component is ever entirely smooth, especially when compared to an injection molded product, like a factory PMAG. Due to this, some sanding needs to be done on a few of the components to reduce any possible hang up issues with the magazine.

**Inner Front Follower Guide Connection Between Upper and Extension Components:**

The upper and lower front follower guides lining up are key to reducing hang up issues. There **WILL** be issues if the area is ignored. The guide on the base may slightly sag on the bottom

when printed due to the orientation, which is why this is necessary. These areas may need to be lightly sanded with a file (typically just the guide on the 10 round base), allowing for a smooth transition between both guides, as seen in Figure 16 below:

**Figure 16: Upper and Extensions Follower Guides Lined Up**

**Follower:**

Using 1200 grit sandpaper, lightly sand all of the contact points on the follower until a smoother surface is achieved. These points include the front, rear and the four smaller rectangular sides.

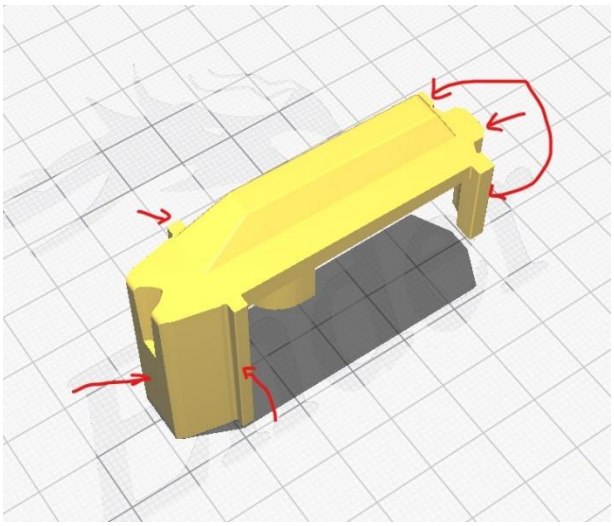

**Figure 17: Follower Contact Points to Sand**

The upper surface of the follower will also be a little rough, even with something like ironing enabled in Cura. To reduce any chances of rounds catching on the surface, the entire upper surface will need to be lightly sanded with a file until smooth.

**Base Plate Retainer:**

To reduce any hang ups with the retainer locking into the base plate, use 1200 grit sandpaper to lightly sand the front and rear points of the retainer until smooth.

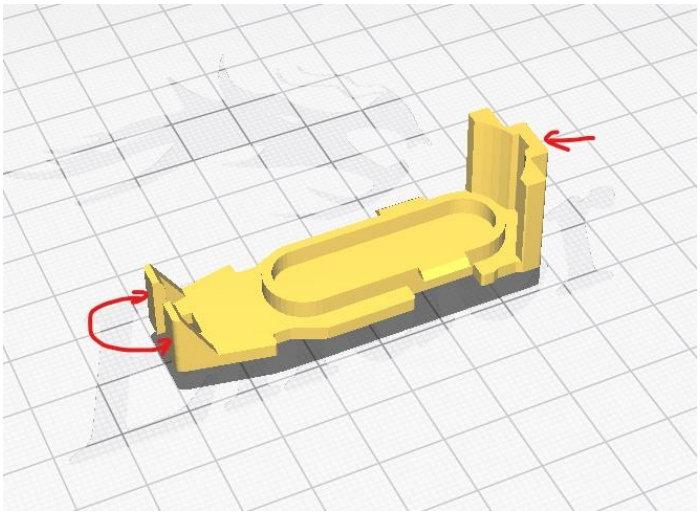

**Figure 18: Retainer Points to Sand**

# Assembly

Outside of sliding on the extensions and screwing the two m3x10 screws into the holes of the extension, in order to hold them in place, the rest of assembly is just like a standard AR15 magazine (excluding the extra steps for the windowed magazine extension). The screws will be a

little difficult to screw in the first time, but once the threads are tapped with the screws when initially putting it together, it will be much easier. Refer to Figure 19 below to see how the follower and retainer should look when attached to the spring:

**Figure 19: Inner Magazine Assembly**

For the windowed +20 magazine extension, the included window guide is to be used in order to help cut out the proper size of the PC sheet needed. After printing the guide out, trace around it on the PC sheet (fine point sharpie recommended) and cut out each of the two pieces with scissors. These should be able to slide into the two openings on the extension somewhat easily. Make sure that they are centered within the openings when pushed in, as well as in the proper orientation, lining up with the curves of the actual cut.

# Common Questions

**Why is the design two-piece instead of one?**

I believe a modular magazine is personally much more useful, especially being 3D printed. The extensions can be easily changed out if one day you want to use one over the other. This can save a lot of time when printing components.

Another big reason for doing this is because it is inherently weaker than an injection molded part, like a factory PMAG. The feed lips, though reinforced, are much weaker as a result of it being 3D printed. If they were to ever break, instead of having to print an entire one-piece magazine body, wasting time and money, only the 10 round base component would have to be reprinted.

**Why does each component have a different fan setting in the slicer?**

The less cooling fan blowing on the component, the stronger the layer adhesion will be. A lot of testing was done at different fan settings for each component to determine the lowest setting that can be used, while still retaining good quality and usability.

**Why is the cut for the PC sheet on the +20 Windowed Extension much wider than the actual piece itself?**

Originally, the opening was made just slightly wider than the PC piece but it was very difficult to push the piece within the openings on the extension. Though the PC pieces must now be centered within the cut when pushed in, they are much easier to install and remove.

**Why is the round count text on the windowed extension different on the right and left sides?**

Being a double stack magazine, the rounds aren't at the same height within the extension on either side. The 20 round text isn't included on the right side of the extension due to the fact that the round sits too high within the extension to warrant the text for it. Magpul solves this by actually coloring part of the magazine spring instead of going off of where the rounds are, but due to variation in springs that can be used for the magazine, this wasn't considered.

# Final Notes

If your printer isn't calibrated in (e-steps and flowrate), the fitment of components will most likely be a little tight or loose. This might not be an issue with some firearm designs, but having a dialed printer is much more necessary for magazines to function well. So, make sure to calibrate your printer beforehand. Tomb of 3D Printed Horrors has a great video on YouTube for doing so.