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## FAQs about the Process

### **Q: Which open source files do I use for a Phoenix hand?**

**A:** We have been successful in using the Thingiverse Phoenix Hand V2 palm (either right or left- doesn't matter) (<https://www.thingiverse.com/thing:1453190>), with V3 fingers, arm guard, and all other parts ([https://www.thingiverse.com/thing:4056253#google\\_vignette](https://www.thingiverse.com/thing:4056253#google_vignette)). The V3 link above also has a helpful video tutorial attached. Remember to size all pieces by 150% before printing.

### **Q: Do my prints need rafts?**

**A:** Yes, but only some. The distals, proximals, and snap pins need rafts as they are small pieces that can easily come off the heat plate during printing unless bound with rafts. The palm, arm guard, and tensioner block do not need rafts. The tensioner pins could be printed without rafts, but there is a possibility that the print fails. However, if you do use rafts, they may be difficult to remove. If so, you can sand down the rafts or increase "Z distance from raft" before printing.

### **Q: What print settings help create strong pieces?**

**A:** There are a few changes you can make to make the pieces stronger. Increasing the infill above 25%, using PETG filament rather than PLA, and avoiding using unnecessary rafts/supports while printing are the most effective.

### **Q: How do I differentiate between the types of pins?**

**A:** The ends of the pins have letters on them, which correspond to the types. Pins with the same letters are for the same parts, and a chart for where each pin type goes can be found in the instructions above.

### **Q: What types of string/elastic bands/screws can be used?**

**A:** For the palm screws, any M4 screw  $\frac{3}{8}$ " or larger can be used, but around  $\frac{1}{2}$ " is ideal. For the tensioner screws, any metallic Phillips head screw between  $\frac{3}{4}$ " and  $1\frac{1}{4}$ " works. The material/type of the string can be nearly anything as long as it can be taught. Twine works, but fishing line is more durable. The elastic bands should be extra heavy grade dental bands, with  $\frac{1}{4}$ " and  $\frac{5}{16}$ " sizes being required.

### **Q: How do I thread my string through the palm?**

**A:** You can easily thread string through the tunnels of the palm by using wire as a tool. Use the wire as a needle by bending the tip of the wire and pinching the string in between. Wrap

the string around the wire a bit to secure, and feed the wire through! Soldering wire was perfect for this as it is stiff enough to maneuver and malleable enough to bend through curved tunnels.

**Q: I thermoformed the wrist guard, but the holes at the top don't line up with the palm. What should I do?**

**A:** If you used a heat gun/reflow station to thermoform, you can aim it at the connection points of the wrist guard until they can be twisted by hand (use gloves), and then adjust them so that they fit with the wrist guard. If you used boiling water, the same process can be done but just by dipping the ends into the water until they can be twisted by hand (again, use gloves when touching hot PLA).

**Q: How can I make parts smaller without reprinting them?**

**A:** Reprinting a smaller part is recommended, but depending on the part, it can be sanded down. The pins in the finger joints and tensioner can be sanded down slightly if needed. If a lot of sanding is required, printing a new part will be significantly more stable. If you're sanding down a finger pin, make sure that the pin is actually meant to go where you're trying to fit it.