



Specification:

- Density(g/cm³ 、 25 C) : Approximately 1.10
- Extensible and reusable, the melting point is 60-63°C and can be shaped in low temperature.
- Will be released to CO₂ and H₂O during 6-12 months.
- When sealed please stock it far away from the fire source and children.

Net Weight:1KG



Product Features

- The revolutionary plastic that melts in hot water and can be moulded by hand
- Hardens as it cools - strong as nylon
- 101 uses for DIY and model making such as prototype mechanical parts or armatures and frames for models
- Becomes easily mouldable at just 62°C.

Polymorph is one of a new generation of commercial polymers set to have a major impact on model making and prototyping. This polymer has all the characteristics of a tough 'engineering' material yet it fuses and becomes easily mouldable at just 62°C. It can be heated with hot water or a hair dryer and moulded by hand to create prototypes and solve manufacturing problems currently outside the capacity of other materials. Uses for Polymorph include: Prototype mechanical parts Armatures/frames for models Specialised components - e.g. motor mountings Moulding for complete products - e.g. torches Joining components together Mouldings for handles & orthopaedic aids Vacuum forming moulds

How to use polymorph

How to make polymorph sheets, brackets and a link to making rods. So far I've worked out how to make flat sheets with a smooth glass like finish and from those sheets simple mounting

brackets with relatively neat 90 degree bends. Be warned, polymorph can give you **severe burns** if it gets on your skin when hot and it sticks! **Never touch it when it's clear!** Not for children.

Stage one - making a sheet of plastic



Find a suitable container to melt the polymorph in. I'm using the container that my blank DVD's came in but any microwave safe container will do. You could also heat this in a pot of boiling

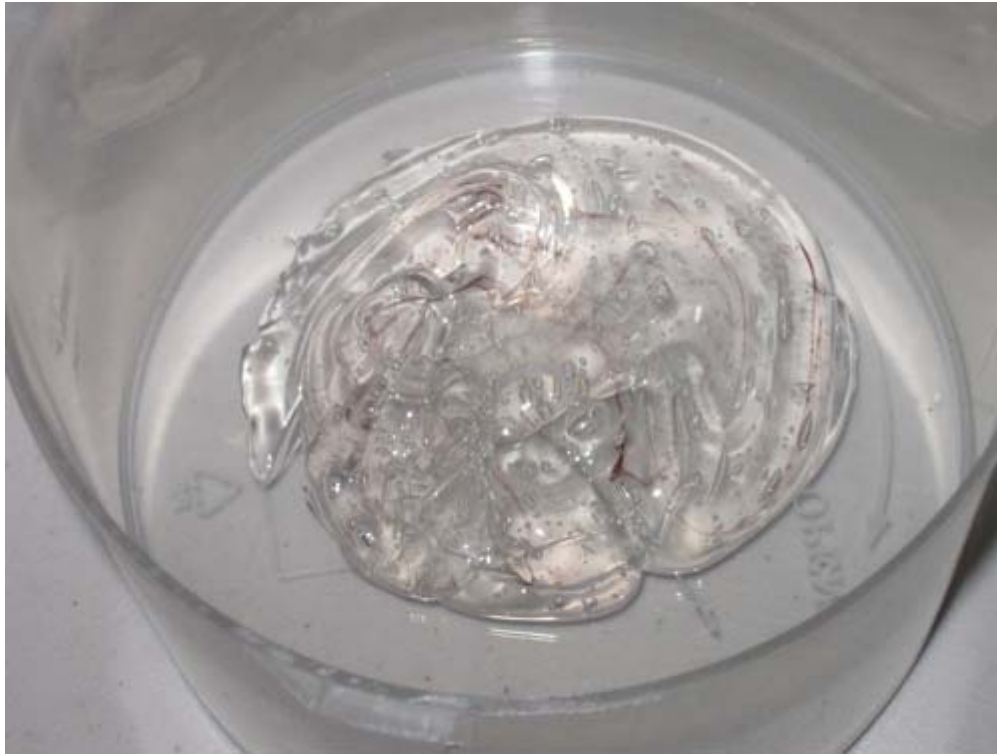
water but the microwave is my personal preference. I'm re-melting some off cuts with some fresh beads.



I heat it for 30 seconds at full power then mix it with a pen. When it is clear, it is sticky and hot enough to burn you.



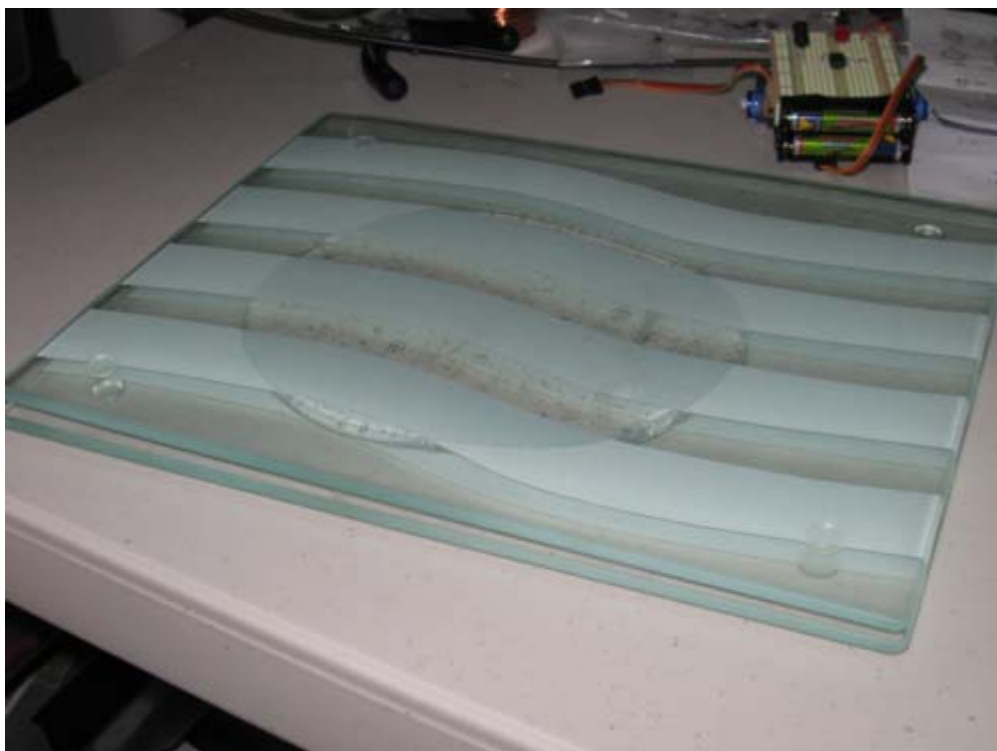
Keep repeating the process of heating for 20-30 seconds and then stirring otherwise some beads won't melt while other sections start to bubble. I try to avoid mixing too much air in as you will end up with heaps of air bubbles in it. Be patient with this stuff as it is slow to transfer heat from the melted sections to the beads. Allow at least 60 seconds between heating sessions for the heat to equalise.



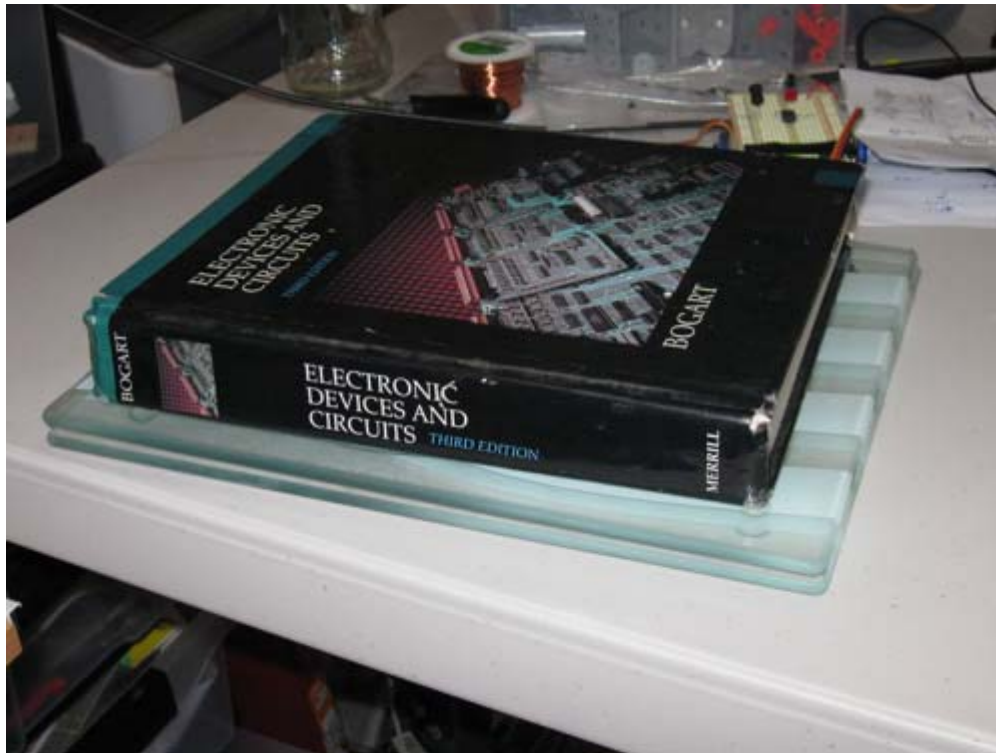
Eventually you will end up with a clear viscous substance. If you happen to have a vacuum chamber lying around then placing this in a vacuum will remove the air bubbles. You could try using a vacuum cleaner to make a homemade chamber or a lid that seals onto the container but it will take time due to the viscosity of the polymorph. I haven't bothered yet as small air bubbles aren't a big deal for my parts.



For squashing my molten polymorph into nice smooth flat sheets I'm using glass drink coasters and placemats. They were quite cheap and are tempered glass. As a bonus the little rubber feet are about 3mm (1/8 inch) high which is an ideal thickness to make polymorph sheets. If you want to go thicker or thinner then you just need to get hold of some spacer material of the right thickness.



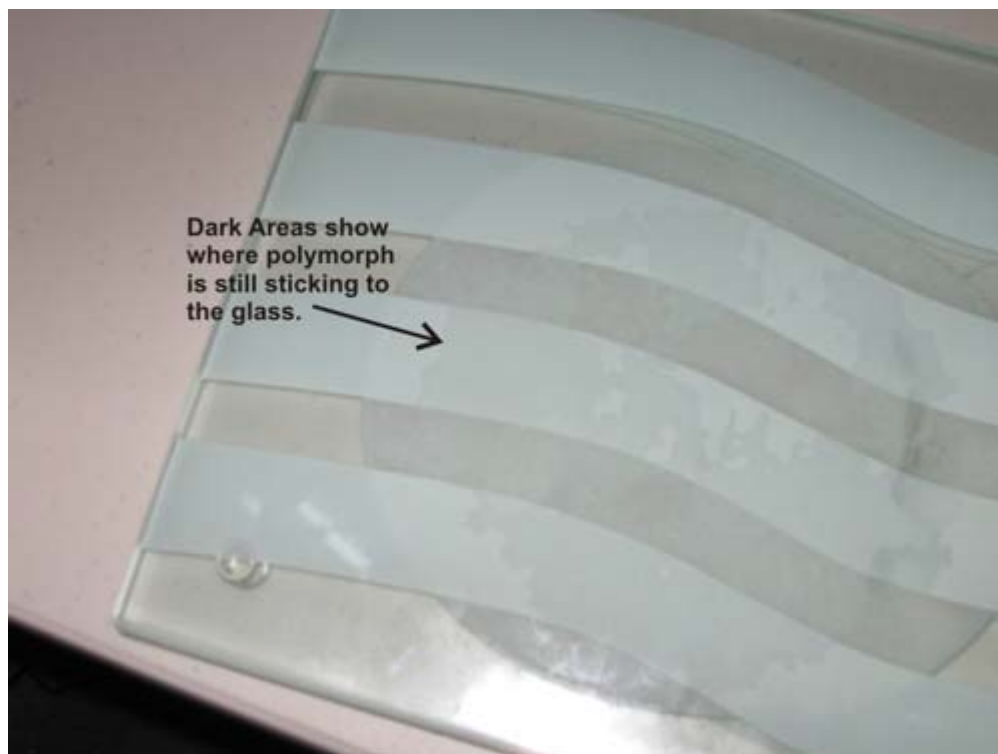
Gently squash the molten polymorph between two glass placemats or drink coasters depending on how bigger sheet you are making. **Always be slow and gentle** as the polymorph is thick and you don't want to break the glass. It is a good idea to wear oven mits or welding gloves while you do this as the glass does get hot and it provides protection if you accidentally break the glass.



Place a heavy book or two on top while it cools. It will take at least an hour to cool. Be patient!



As it cools it will slowly go opaque.



Do not try to separate the glass sheets by force. You can see in this photo that in some sections it is still stuck to the glass. When it has cooled completely it will break away from the glass since it contracts at a different rate to the glass. You will hear a sound like

glass cracking when it releases. Can give you a bit of a fright if it is next to you when it happens.



The finished product! A plastic sheet of uniform thickness and a glass smooth finish. This can be cut with a sharp knife or even scissors if it is thin enough.

Stage 2: Making a mounting bracket for a servo.

Cut a strip of the plastic sheet to make your bracket with.

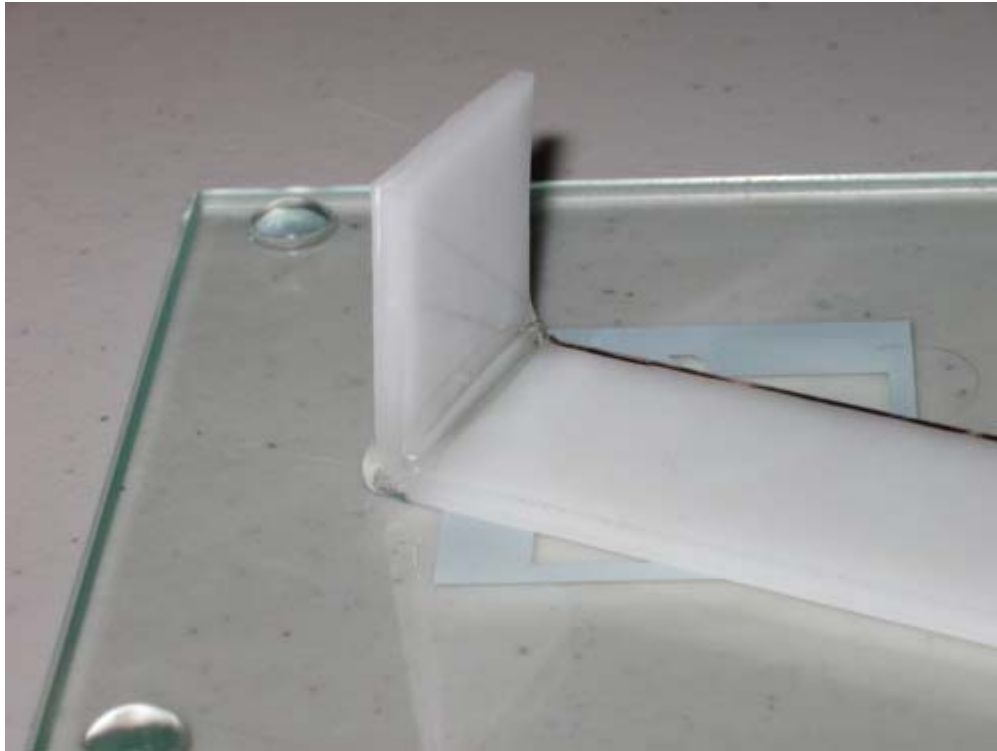


Once you have a strip with one end cut neatly at 90 degrees we are ready for the first bend.

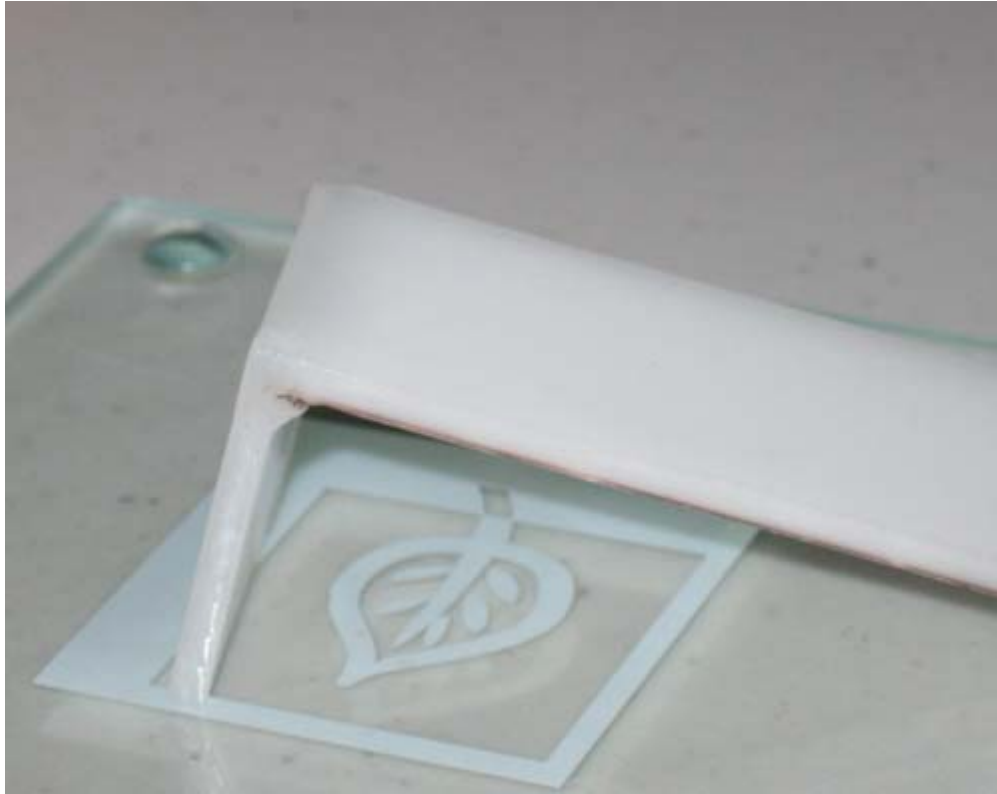


I originally tried to just heat a section with a cigarette lighter and bend it over a table edge. The result was terrible, it was round and ended up with accidental fingerprints in it. While my new method might seem odd at first, it is just as easy and provides a clean sharp bend without much practice. First off, cut about 2/3rds of the way through with a knife and bend in the opposite direction to what you want.

Heat the exposed section with a cigarette lighter quickly and evenly until it just starts to go transparent at the cut edges. Now bend it in the opposite direction so that the transparent edges squash together and the uncut section becomes your sharp bend. This has to be done quickly so I had trouble taking photos.



Now press the bracket against your glass to get nice smooth corners. If you wet your finger then you can quickly run it down the middle to get a nice finish on the inside of your bend without the hot polymorph sticking to you. By continually pressing lumps against the glass you will end up with a fairly neat bend. Hold it at 90 degrees until it cools as it will tend to bend inward.



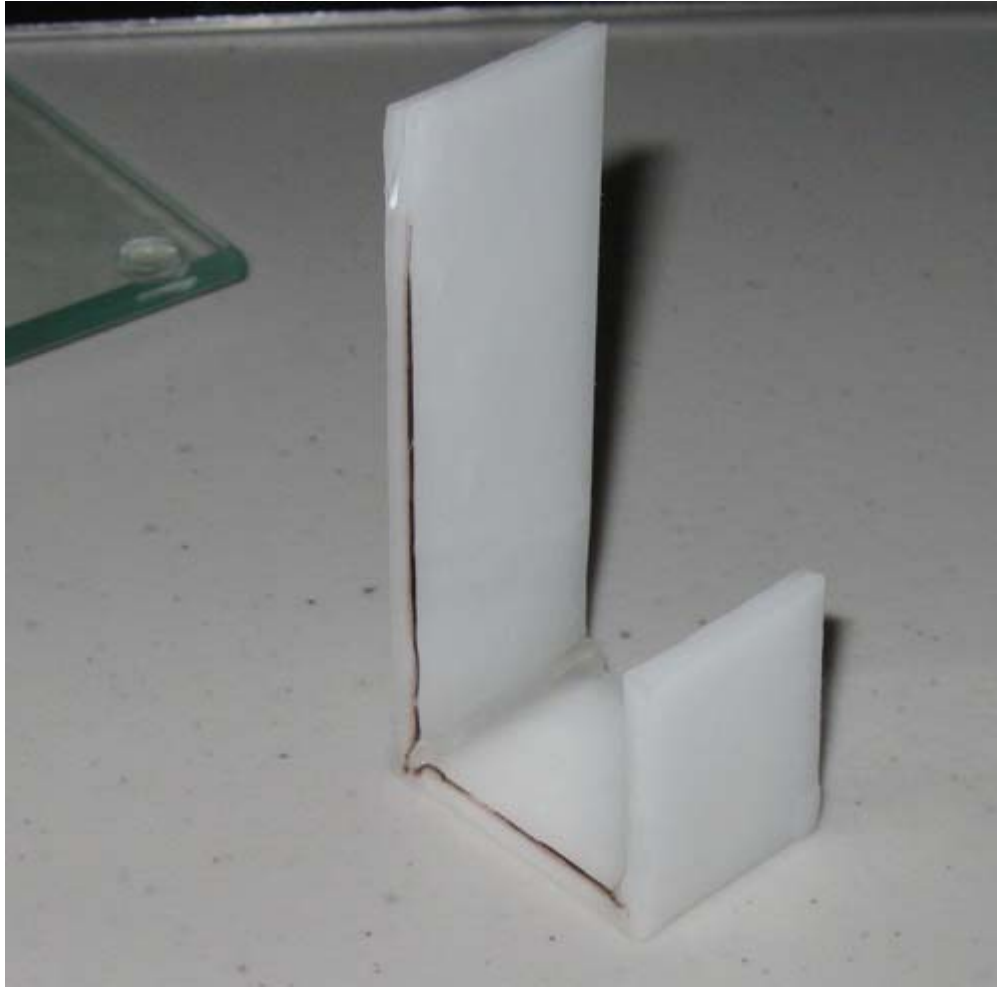
It should look like this when it cools. Now for a second bend to make a U shaped bracket.



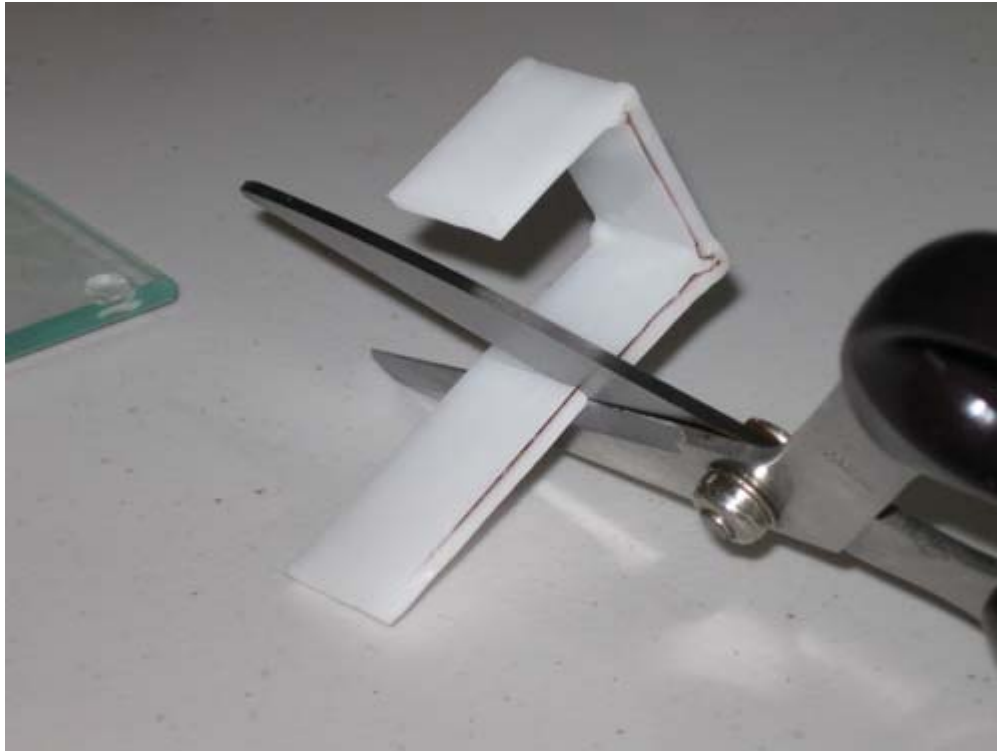
As you can see I have cut and bent it in the opposite direction to what I want. The uncut section gives us the nice clean bend when folded back the other way.



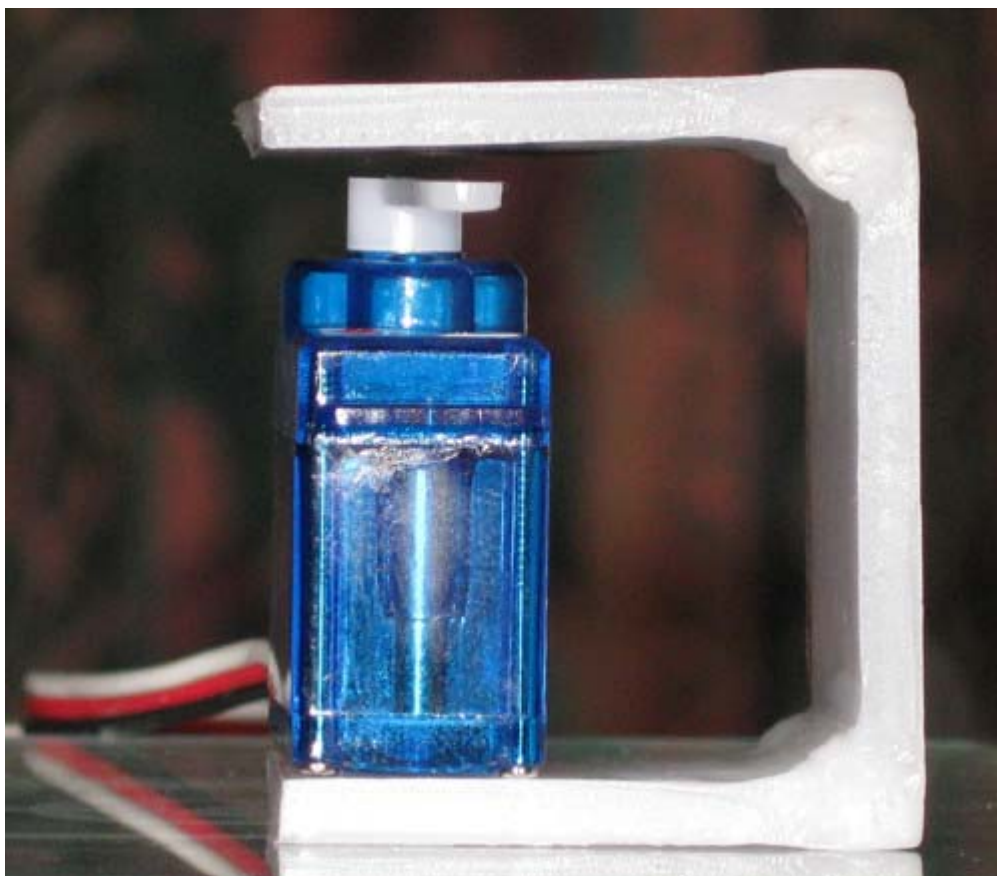
This is it after heating with a cigarette lighter, you can see the cut edges have gone transparent. Try not to overheat the uncut section otherwise you will get a messy bend. Because I stopped to photograph this bend and the heat spread, this second corner was not as neat. So be quick after you heat the joint.



The black line is from my marking out the strip prior to cutting, if you look at it in the last three photos you will get a better idea of how the plastic folds and rebonds. I would have liked to do a video but I'd need a tripod and more room to set it up.



Now cut off the excess. My strip was aprox. 3mm thick so I could just cut it with scissors.



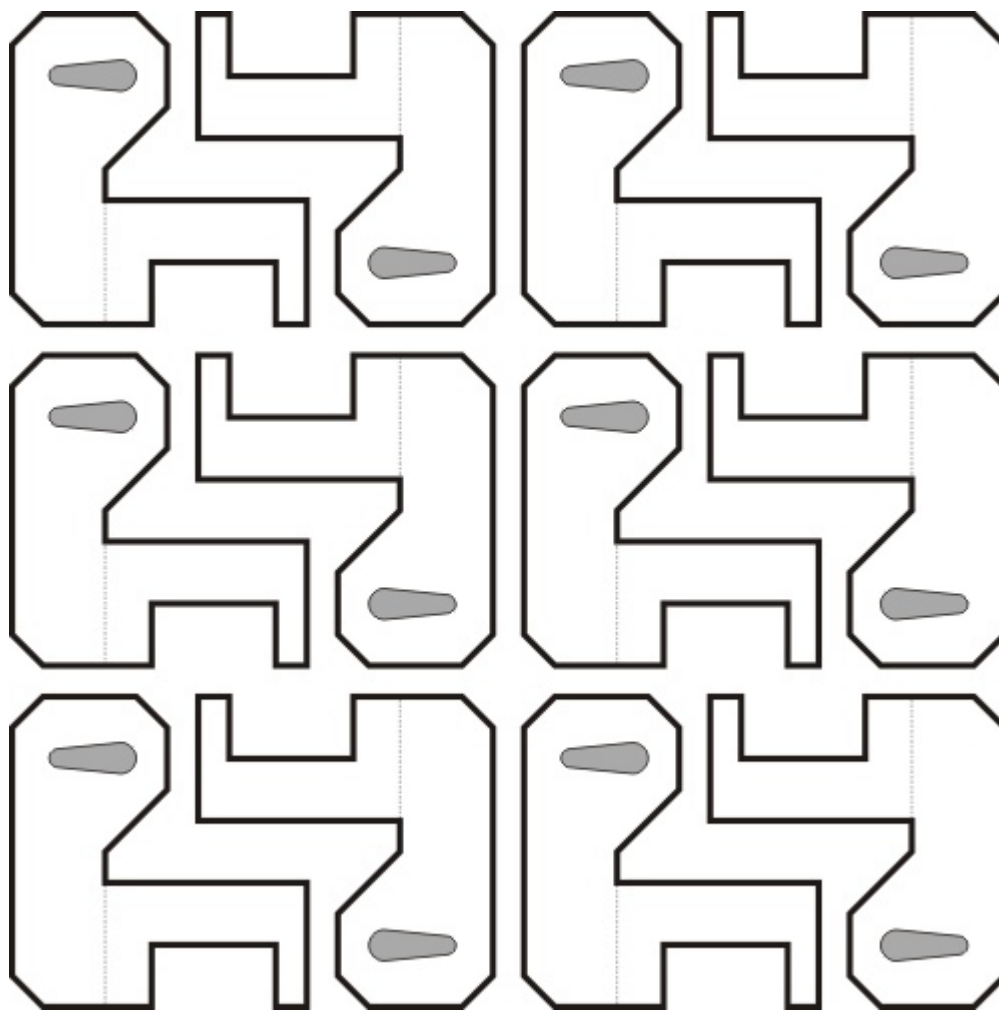
And there you go, a homemade plastic mounting bracket for a servo.

I had to make a number of brackets for a robot and wanted them all the same. I realised that I could design them on the computer, print out the pattern with a laser printer and use that printout as an iron on transfer.

Set your iron to it's hottest setting, no steam!



Print your pattern. If you do not have a laser printer then get it photocopied.



This was my pattern. Now place it face down on a fresh polymorph sheet and run over it quickly with the iron. If you are too slow the polymorph will melt into the paper. If you are too quick the image won't transfer cleanly.



I was a bit slow and some paper stuck to the polymorph. I soaked the sheet in cold water for half an hour then gently scrubbed the paper off with a soft plastic scrubbing brush.

This was the result. The polymorph sheet did buckle a bit from the heat. I placed it back between the glass with a book on top until it cooled. If that doesn't work try sitting it in warm water first and then repeat.

Guibot posted a [good link](#) for shapeing polymorph that included instructions for making rods of different thicknesses.

If you know of a good way to make robot parts from polymorph then make a walkthrough for LMR. I'm still looking for a good way to make wheels and other parts without expensive machinery.

Good luck and enjoy!

Made of polymorph:

Moulds of light cover:





Mould of rings:





Snail:

